TX1500 Matrix, TX1500 Keyboard,
TX1500/AL16 and TX1500/BBUS-IF

Installation Guide

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UNPACKING

Inspect the packaging for signs of damage. If damage has occurred, advise the carriers and/or the suppliers immediately. Unpack the units carefully and check that all the items are present and correct.

SAFETY PRECAUTIONS

All normal safety precautions as laid down by British Standards and the Health and Safety at Work Act (or the relevant National safety legislation if installing in a country outside the U.K.) should be observed, and servicing should be referred to qualified service personnel.

SYSTEM COMPONENTS

Each complete system will comprise of at least the following:

1 x TX1500 video matrix enclosed in a 19" sub rack.
1 x TX1500/KBD system keyboard or TCommand Touch Screen keyboard

2 x RJ45 straight patch cables
2 x RJ45 breakout boxes with self adhesive mounting pad

2 x 9Vdc 500mA power supply (1 for the matrix and 1 for the keyboard)

TX1500/32/8 matrix

Standard TX1500/KBD System Keyboard

Optional T Command Touch Screen Keyboard

OVERVIEW

The TX1500 is a video matrix and telemetry control system offering control of up to 96 cameras from 4 control positions. Eight monitor outputs are provided with monitors 1,2,3 & 4 having on screen display.

BBV & VISTA up-the-coax and BBV 485 & VISTA 485 linked receivers and domes can be controlled when viewed on any monitor. Pelco and VCL up-the-coax control is limited to monitors 1-4.

Site alarms and contacts are handled with alarm cards, each providing 16 inputs. Up to 6 alarm cards can be linked into the TX1500 system either locally or remotely offering 96 alarm inputs
The TX1500/BBUS-IF interface, which appears as another keyboard, gives off-site control, via video/data transmission equipment, and local control from PC and other equipment. The interface can be controlled using either the TX1000 or TX1500 control protocol via either RS232 or RS422/485.

The TX1500 matrix communicates with all keyboards, alarm cards and BBUS-IF interfaces via a polled 4-wire multidrop RS422 control bus named BBUS.

The matrix itself is in a subrack which can be fitted to a 19" rack using supplied 'ears' that can be mounted on the front or rear face of the subrack. By fitting the ears on the back of the subrack, it can also be wall mounted.

Alarm cards, BBUS-IF and StarCards are supplied in 1U sub racks as standard or can be fitted into the subrack with the matrix if specified when ordering.
Larger subracks than standard can be supplied if specified when ordering.

PRODUCT CODES

TX1500/16/8	16 camera, 8 monitor matrix inc keyboard (supplied in 3U subrack)
TX1500/32/8	32 camera, 8 monitor matrix inc keyboard (supplied in 3U subrack)
TX1500/48/8	48 camera, 8 monitor matrix inc keyboard (supplied in 5U subrack)
TX1500/64/8	64 camera, 8 monitor matrix inc keyboard (supplied in 5U subrack)
TX1500/80/8	80 camera, 8 monitor matrix inc keyboard (supplied in 7U subrack)
TX1500/96/8	96 camera, 8 monitor matrix inc keyboard (supplied in 7U subrack)
TX1500/KBD	keyboard with 3-axis joystick
TX1500/AL16	16 input alarm card, volts free normally closed inputs
TX1500/BBUS-IF	BBUS Interface to allow control from a PC or other 3rd party equipment
STARCARD	StarCard with 8 x RS422/485 outputs to allow star wired telemetry
STARCARD/CONVERTER	As STARCARD with built in protocol conversion to allow control of domes etc.

EXPANDING AN EXISTING SYSTEM on site (maximum of 96 camera inputs)

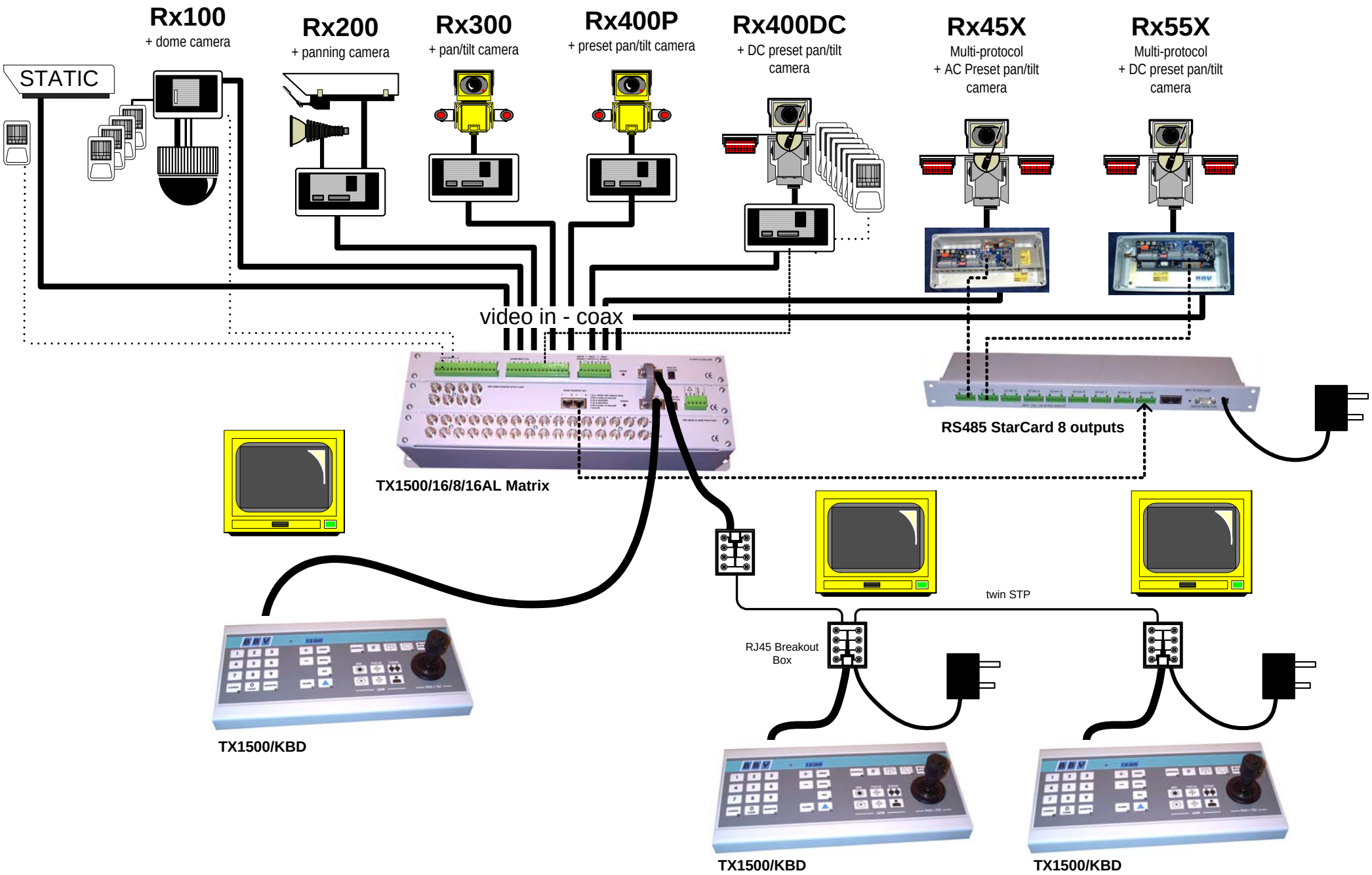
Camera Inputs	Number of video input cards	Minimum subrack Size
32	2	3U
48	3	5U
64	4	5U
80	5	7U
96	6	7U

Larger subracks can be ordered with the product code shown below. All the cards from the existing subrack must be transferred to the new subrack. Note all the external connections to aid re-commissioning the system.

PRODUCT CODES

TX1500/EXP16(17-32)	16 video input card to expand from a 16 camera to 32 camera system
TX1500/EXP16(33-48)	16 video input card to expand from a 32 camera to 48 camera system
TX1500/EXP16(49-64)	16 video input card to expand from a 48 camera to 64 camera system
TX1500/EXP16(65-80)	16 video input card to expand from a 64 camera to 80 camera system
TX1500/EXP16(81-96)	16 video input card to expand from a 80 camera to 96 camera system

3U	TX1500/3U-SUBRACK
5U	TX1500/5U-SUBRACK
7U	TX1500/7U-SUBRACK


Rx100
+ dome camera
Rx200
+ panning camera
Rx300
+ pan/tilt camera
Rx400P
+ preset pan/tilt camera
Rx400DC
+ DC preset pan/tilt camera
Rx45X
Multi-protocol
+ AC Preset pan/tilt camera
Rx55X
Multi-protocol
+ DC preset pan/tilt camera
STATIC
video in - coax
TX1500/16/8/16AL Matrix
RS485 StarCard 8 outputs
twin STP
RJ45 Breakout Box
TX1500/KBD
TX1500/KBD
TX1500/KBD

BBUS CONTROL BUS

The TX1500 communicates with all keyboards, alarm cards and BBUS-IF interfaces via a polled 4 wire multidrop RS422 control bus named BBUS.

All the units are equipped with standard RJ45 connectors allowing cat 5 patch cables to be used to connect over short distances. On the larger sites RJ45 break out boxes are used to link between cat 5 cables and good quality screen twin twisted pair data cable. Suitable types are the following Belden cables: 9842, 9829, 8162, 8132.

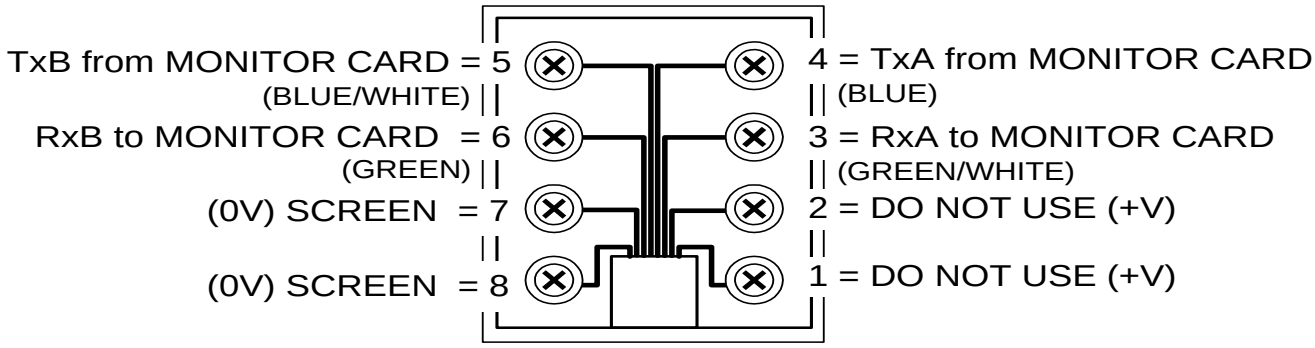

TxB from MONITOR CARD = 5
(BLUE/WHITE)
RxB to MONITOR CARD = 6
(GREEN)
(0V) SCREEN = 7
(0V) SCREEN = 8
4 = TxA from MONITOR CARD
(BLUE)
3 = RxA to MONITOR CARD
(GREEN/WHITE)
2 = DO NOT USE (+V)
1 = DO NOT USE (+V)

Fig 5. BBUS - RJ45 breakout box connector, MONITOR CARD end of BBus.

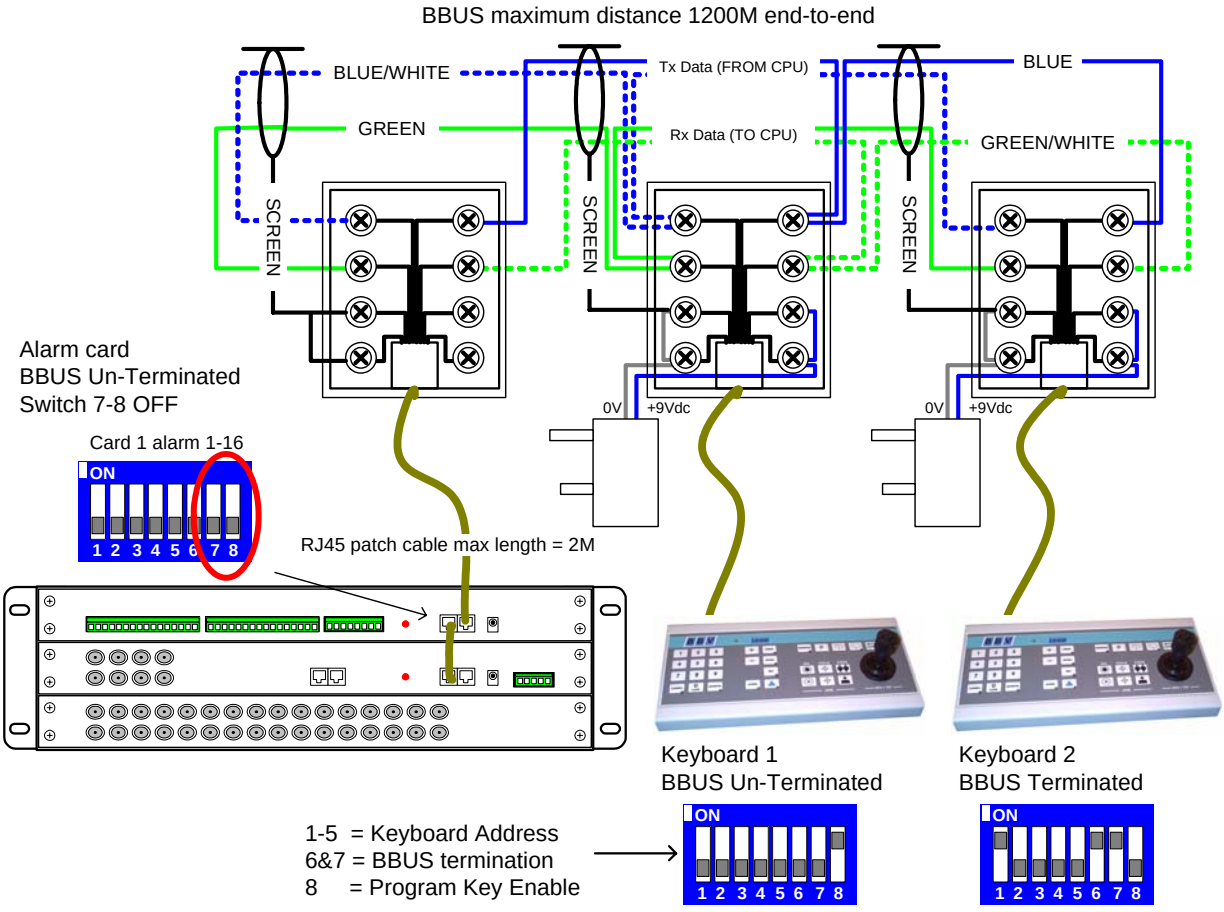


Fig 6. Keyboard BBUS wiring

SYSTEM BBUS WIRING EXAMPLES

The following diagrams show examples of various wiring schemes.

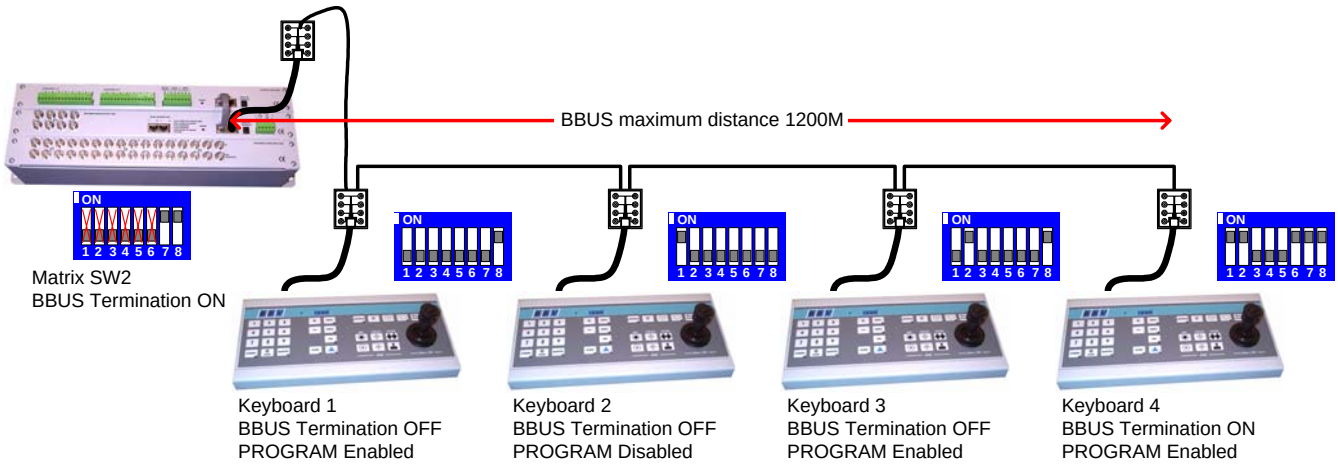


Fig 7. Example with all keyboards daisy chained from the TX1500 matrix using a single BBUS leg.

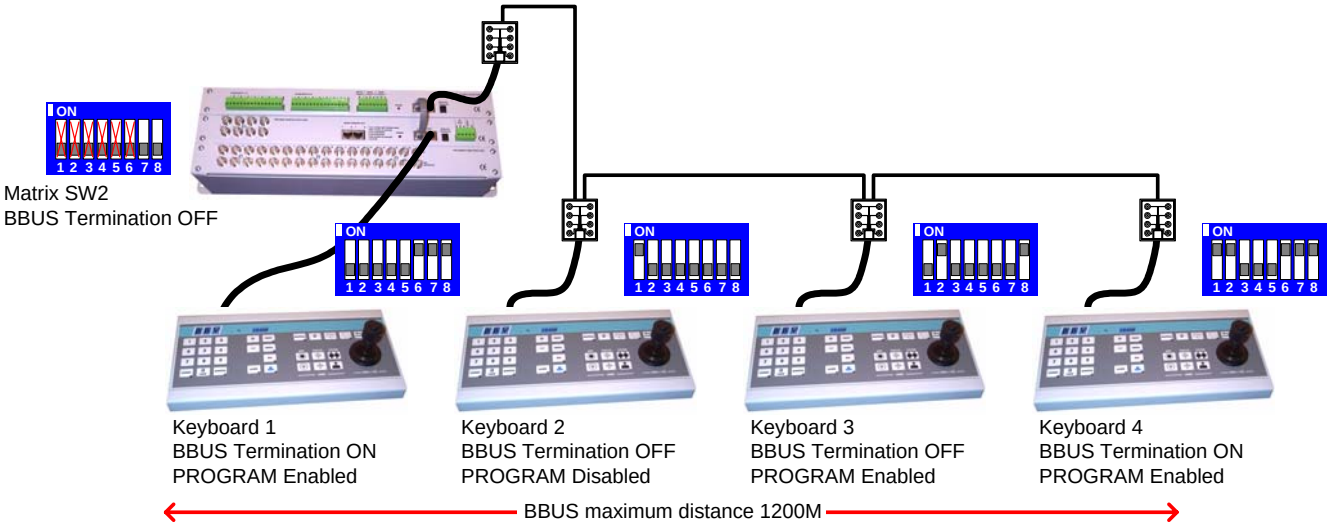


Fig 8. Example with all keyboards daisy chained from the TX1500 matrix using two BBUS legs.

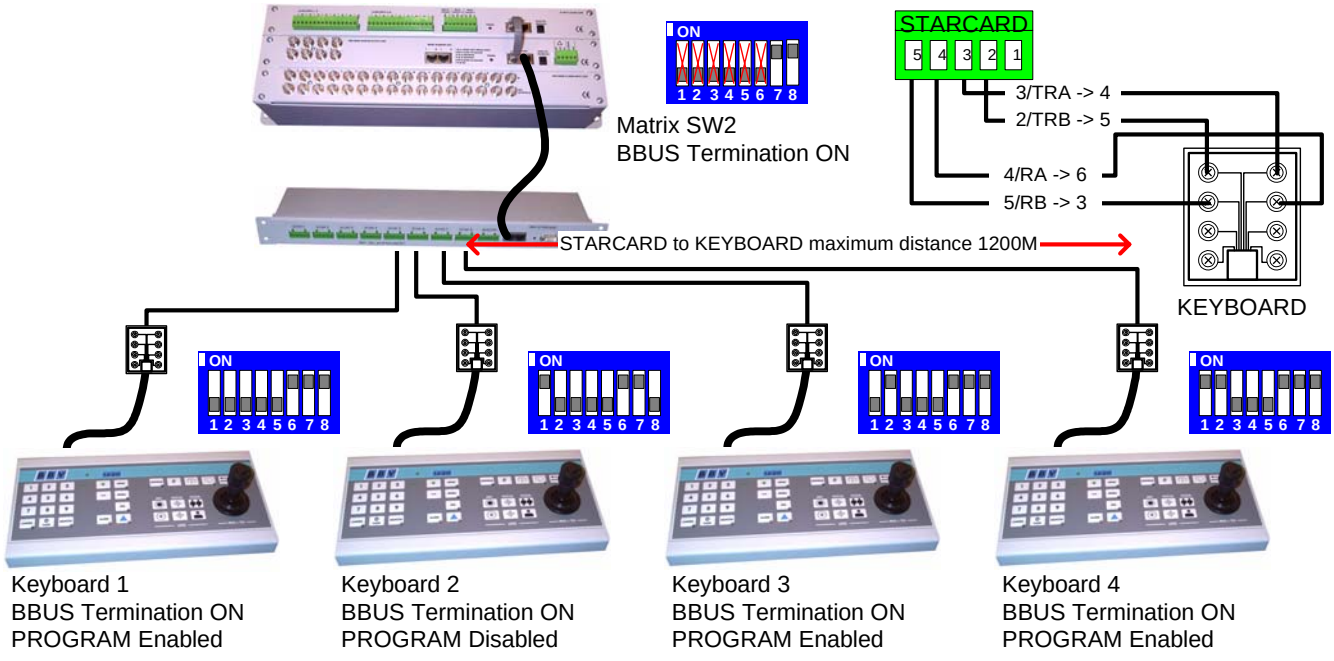


Fig 9. Use of a STARCARD to allow star wiring of keyboards.

RS485 TELEMETRY OUT

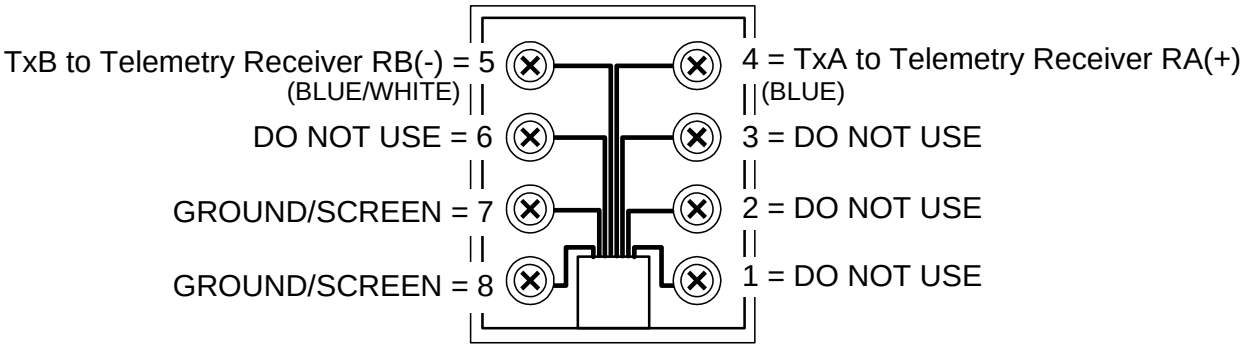

TxB to Telemetry Receiver RB(-) = 5
(BLUE/WHITE)
DO NOT USE = 6
GROUND/SCREEN = 7
GROUND/SCREEN = 8
4 = TxA to Telemetry Receiver RA(+)
(BLUE)
3 = DO NOT USE
2 = DO NOT USE
1 = DO NOT USE

Fig 10. TELEMETRY – RJ45 breakout box connector.

This port provides telemetry control via BBV RS485. Again a Cat 5 RJ45 patch cable and breakout box is used to connect the telemetry receivers via single twisted pair cable. It is possible to either wire the network in a daisy chained or star configuration using an optional RS485 star card.

RS485 wiring configurations are shown below and on the following page.

RS485 TELEMETRY WIRING CONFIGURATIONS

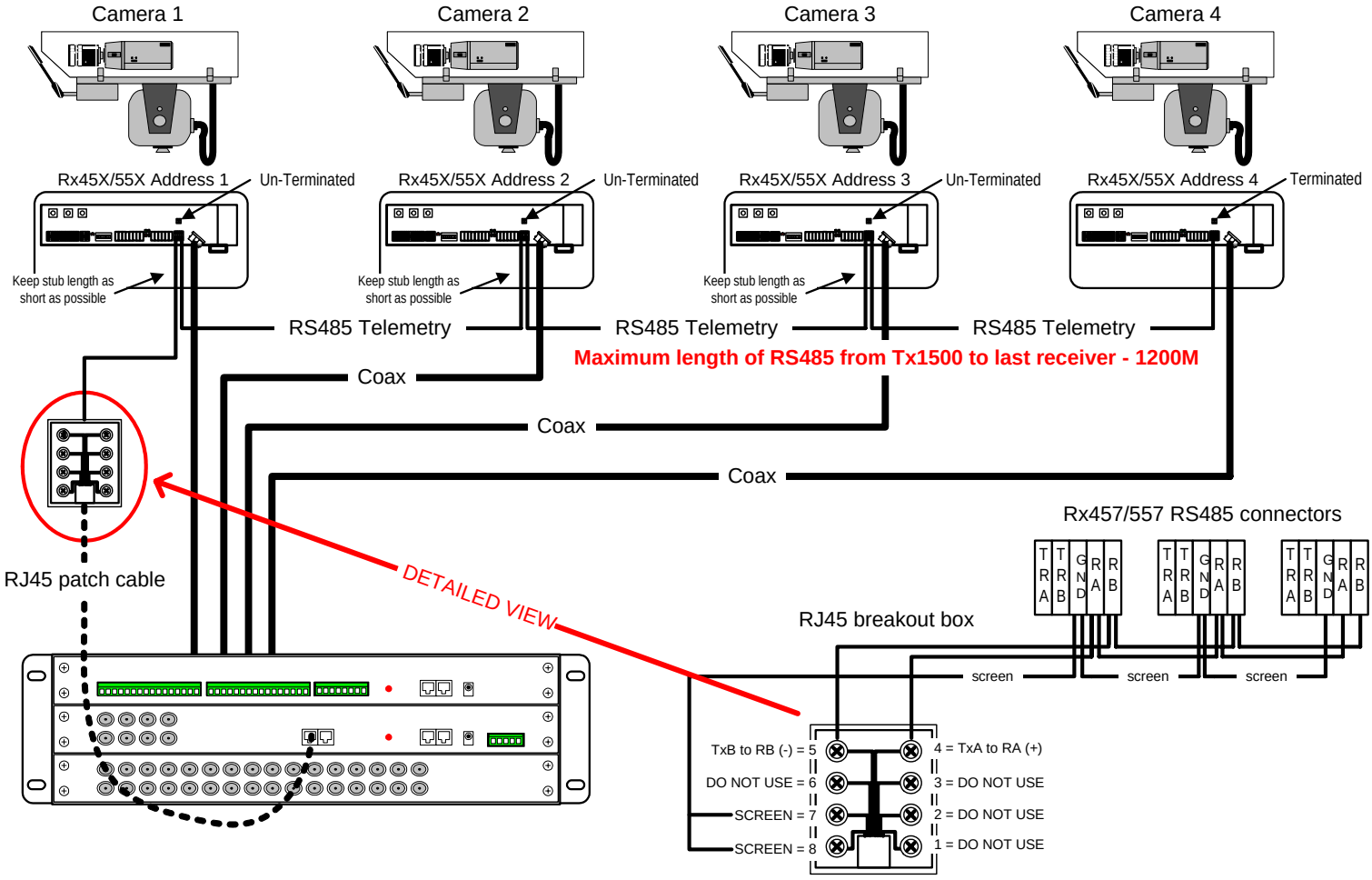


Fig 11. Daisy Chained RS485 Telemetry Wiring

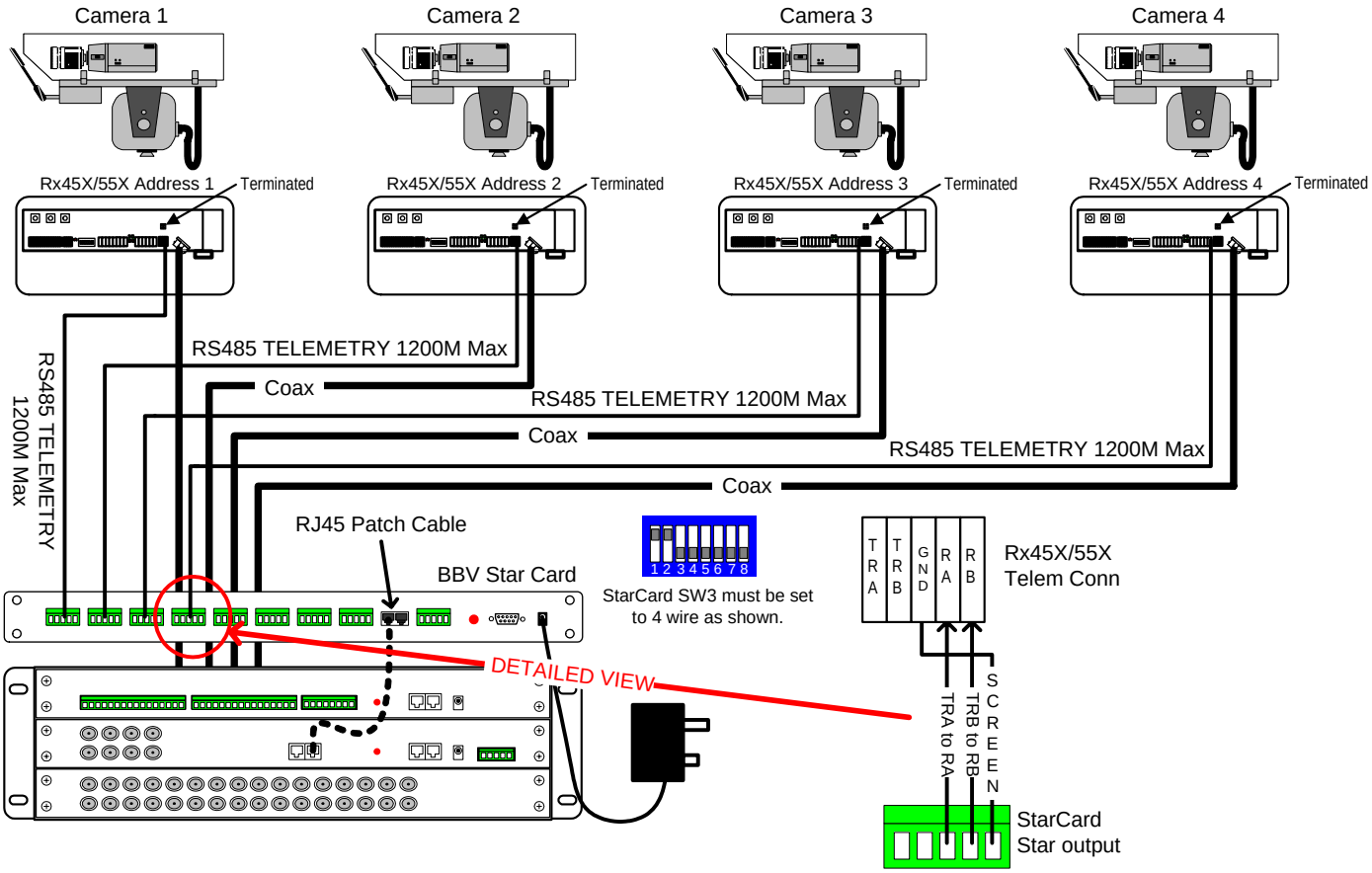


Fig 12. Star Wired Configuration using the optional BBV StarCard

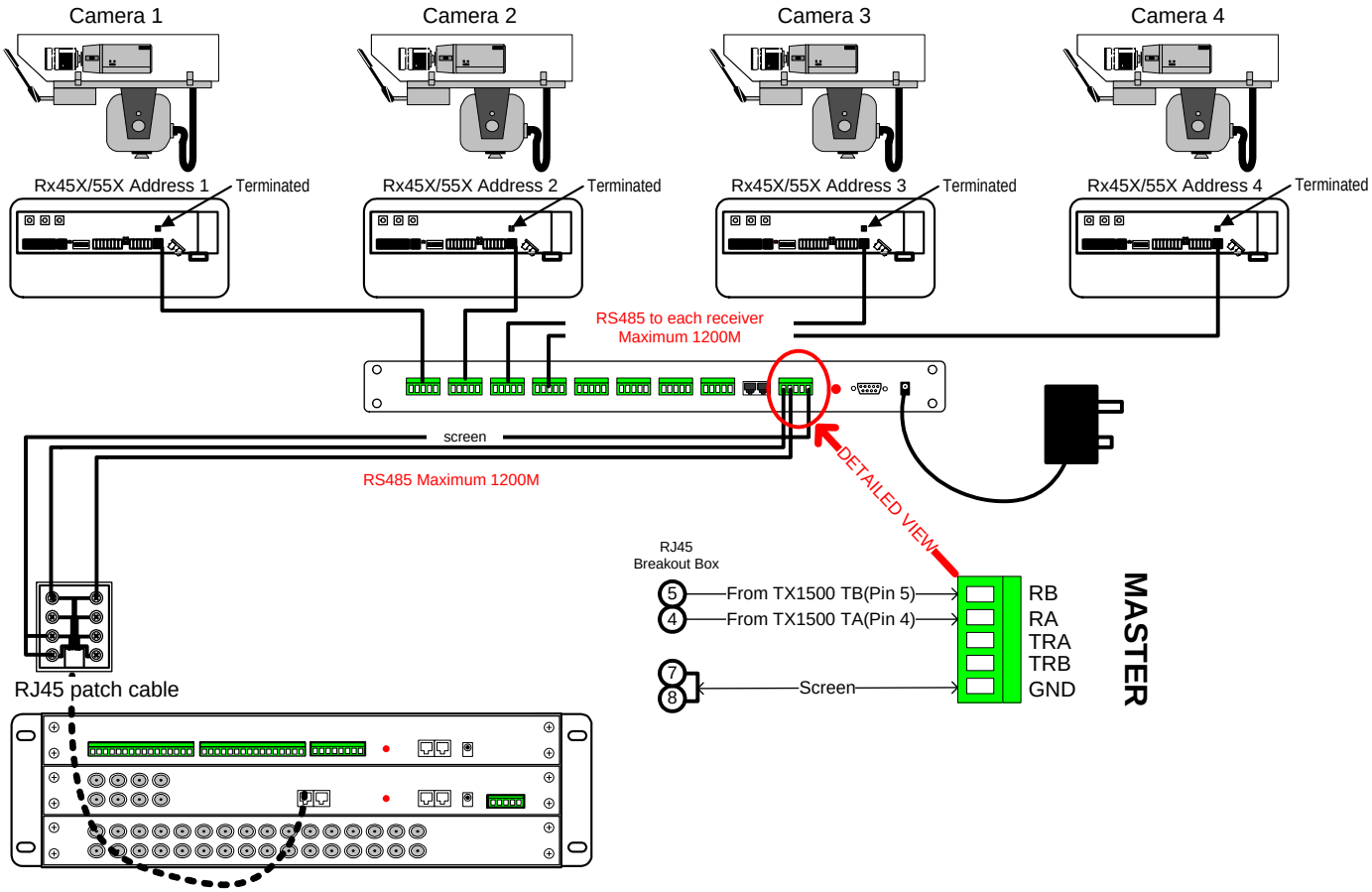
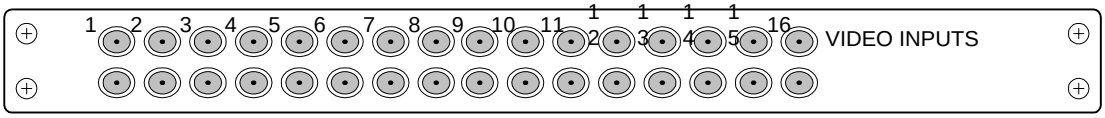


Fig 13. Use of StarCard mounted remotely, reducing cable runs

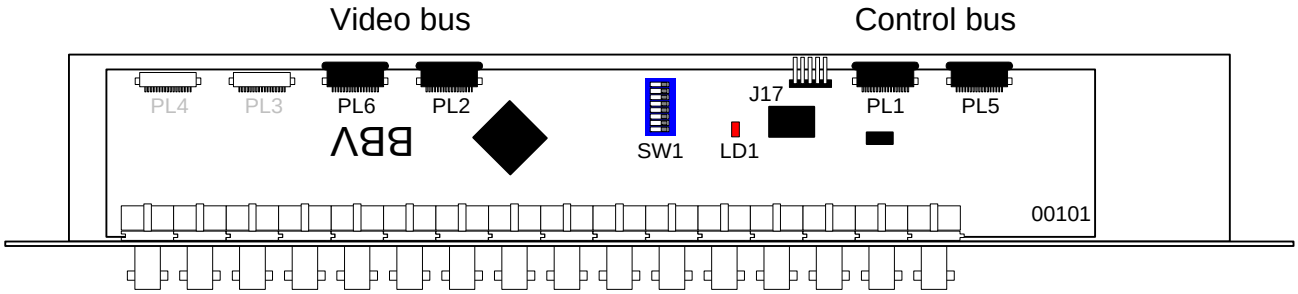
VIDEO INPUT CARD

The Video Input Card is used to connect 16 camera inputs to the TX1500. Systems larger than 16 cameras will use multiple cards. A board mounted DIL switch is used to set the card's camera number range.

Each input has a corresponding looping output on the lower BNC connector. The camera inputs are passively terminated at 75Ω and auto de-terminate when a BNC plug is connected to the looping output. Up to 6 cards can be connected in a matrix to control up to 96 cameras.



Video Input card Front Panel View

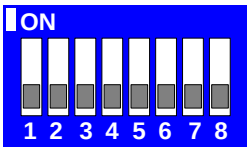


Top view of Tx1500 video input board PCB00101

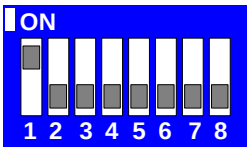
The switches for each card will be set at the factory however if the system is to be upgraded then please set the new card(s) switches as shown below.

SW1 Camera Range

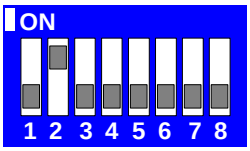
Camera 1 - 16



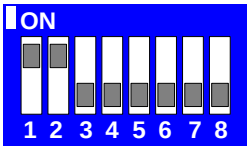
Camera 17 - 32



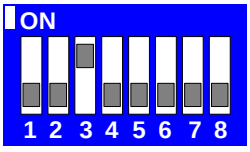
Camera 33 - 48



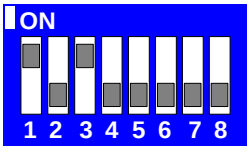
Camera 49 - 64



Camera 65 - 80



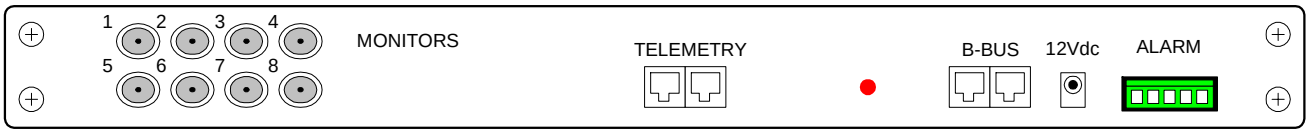
Camera 81 - 96



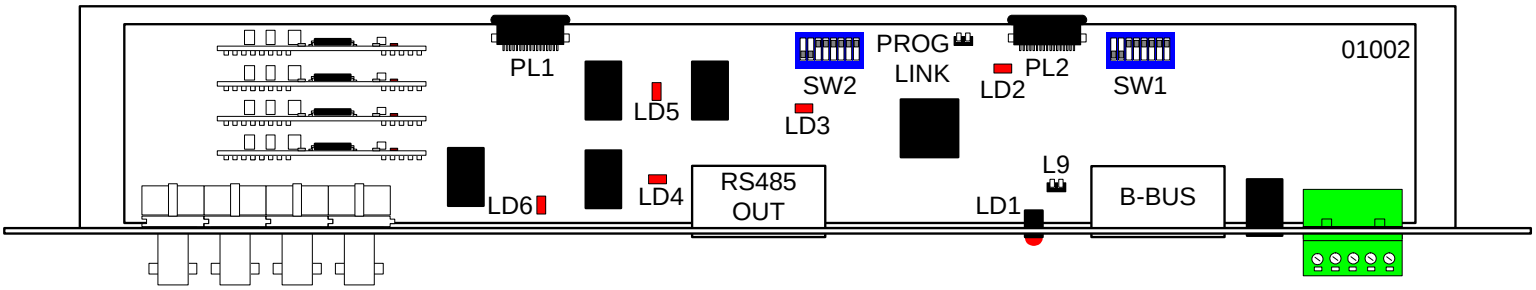
Video Input card SW1 address switch setting

MONITOR OUTPUT CARD

This card provides the 8 monitor outputs, BBUS, RS485 telemetry and a relay output.
Internal switches are used during specific BBV tests that should not require on site adjustment.



Monitor Output card Front Panel View



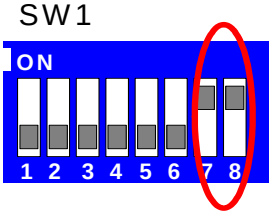
Monitor Output card internal view

LD1 STATUS – Front Panel indication of system and BBUS operation. Refer to page 16.

Internal LEDs,
LD2 – BBV debug use.
LD3, 4, 5, 6 – ON whilst coaxial telemetry is transmitted to the camera

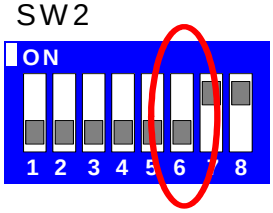
For normal operation the internal switches must be as shown below:

SW1



B-BUS RS485
ON = Terminated
OFF = Un-terminated

SW2

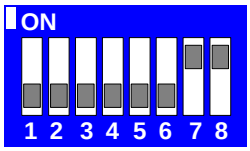


RS485 Telemetry
ON = Terminated
OFF = Un-terminated

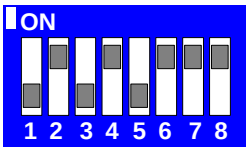
To reset system to factory defaults:- Power off the TX1500, set the switches as below and power up the TX1500. On screen instructions are displayed on monitor 1 output.

Power Up Factory Reset

SW1



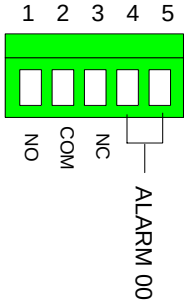
SW2



NOTE: The Power Up Factory Reset option will delete all TX1500 parameter programming.

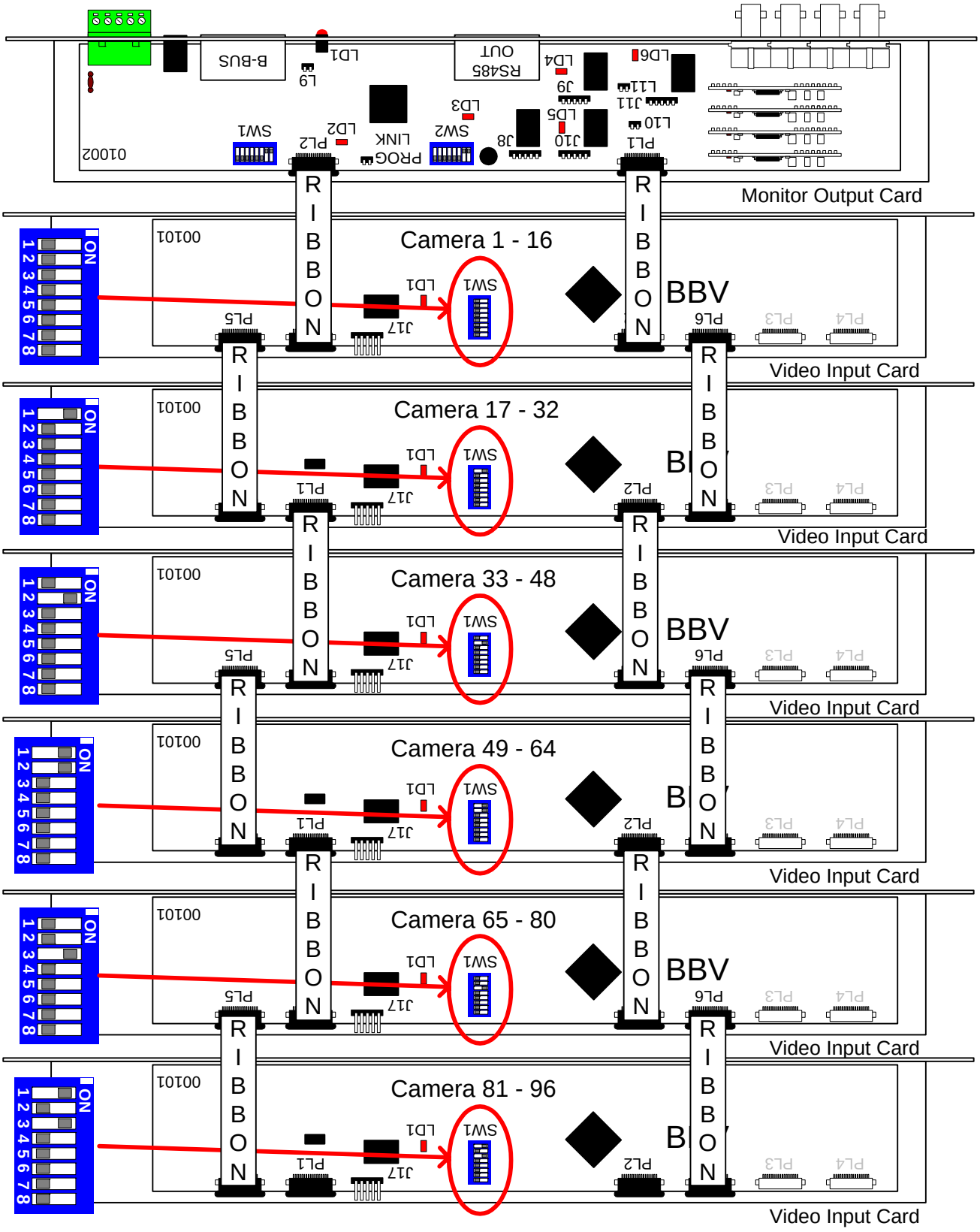
Contact BBV technical support for guidance. +44(0)1323 444600.

CHANGEOVER RELAY
operated by the triangle key
Volts free contacts for low voltage switching only



Alarm 00 input can trigger one of several actions, refer to page 19
Input from volts free, normally closed contacts

96 CAMERA SYSTEM SUBRACK CARD CONFIGURATION



Wiring and switch settings for Video Input cards and Monitor Output card.

MATRIX DIAGNOSTICS

The matrix STATUS led indicates system operation as follows:

Flashing Dimly	The matrix is powered with at least one keyboard connected. Use 58# to display the keyboard numbers that the matrix has detected on the BBUS.
Mainly OFF, 1 second ON	The matrix is powered with no keyboards connected. – If keyboards are connected then make sure that each keyboard address is unique between 0 – 3. Keyboards sharing an address will cause the matrix to ignore both keyboards with unpredictable results.
OFF	Either the matrix is not powered or has an internal fault. If the power supply seems fine then please contact technical support for further assistance.

Several commands exist that allow on site diagnostics. These commands must be entered from keyboard 1 and display results on monitor output 1.

51# Display the matrix firmware version, number of resets and watchdog resets.
TX1500 Version shows the matrix firmware version number ie 2.3
resets shows the number of times that the system has lost power or the menu has been accessed.
watchdogs shows the number of times the matrix watchdog has reset the matrix. A high figure here can indicate that there may be interference or power fluctuations.

55# Coaxial telemetry on.
With normal operation, the coaxial telemetry is only transmitted to a receiver whilst a camera is being controlled. After a short period the telemetry transmission is stopped. This is prevent interference to sync separators in DVRs etc. When trouble shooting telemetry problems the telemetry should be on all the time so the 55# command would be used and then the receiver CABLE and ERROR leds inspected. Pressing # again will stop the telemetry transmission.

56# Display the status of matrix switch SW1, the display shows a HEX number which corresponds to the switch settings for SW1. The number is displayed whilst the # key is pressed. Releasing the # key will clear the number from the screen.

Number displayed	SW1 switch
0	1 - 6 OFF
1	1 ON
2	2 ON
4	3 ON
8	4 ON
10	5 ON
20	6 ON

When more than 1 switch is ON then the number displayed will the sum of the values of all switches that are ON, ie. 1,2 ON, display shows 03, 1,2,3,4 ON displays 0F
RS485 telemetry directly from the TELEMETRY port and should not normally be selected.

Example numbers that could be displayed
0 = normal mode
1 = DIXONS mode – This is a special mode developed for DSG driving Mark Mercer

57# Display the status of matrix switch SW2 as per 56#.
2A = SW2-2/4/6 ON = FACTORY INITIALISATION on a power up. This is used to clear any programming and load default values. Useful if the matrix has had a corrupted programming. Once powered up turn all SW2 switches OFF again to prevent further accidental initialisations.

58# Display number of keyboards or BBUS/I-F with addresses connected to the matrix along with the software version of each keyboard or BBUS/I-F.

TX1500/AL16 - 16 ALARM INPUT CARD

Each alarm card provides 16 individual normally closed volts free alarm inputs. The card communicates via the BBUS with the monitor output card. Power is supplied either via the BBUS interface when the alarm card is mounted in the TX1500 subrack or via an external 9Vdc supply when mounted remotely.

NOTE: Only 1 alarm card can be powered from the BBUS port.

The power led is used as a status indication and shows the following:
Mainly ON, flashing OFF when the alarm card is polled, approx 2-3 times every second. (NORMAL)
OFF permanently – alarm card not powered or faulty.
ON permanently – Not polled by MONITOR card, BBUS cable faulty or ALARM card faulty.

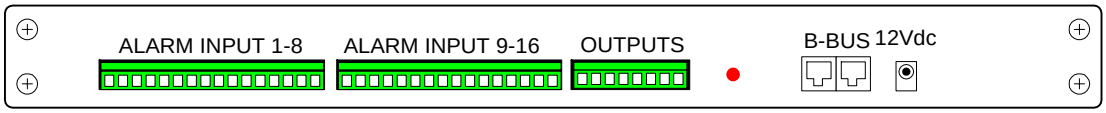


Fig 23. Alarm card front panel view

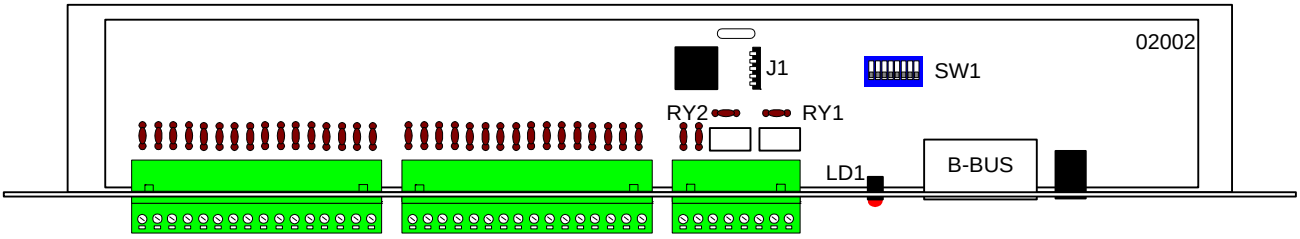


Fig 24. Alarm card internal view

SW1 is used to set the alarm card address as follows:

Switches 7 & 8
BBUS RS485 Termination
ON = Terminated
OFF = Un-terminated

Must be ON if the alarm card is at the end of line and OFF otherwise.

Alarm card 6 shown as end of line.

Fig 25. Alarm card SW1 address switch settings

Each alarm card has two single pole changeover relays called Relay 1 and Relay 2. These relays can be driven manually and also from alarm activations. The system relay numbers are assigned as follows:

Alarm Card	Relay 1	Relay 2
1	1	2
2	3	4
3	5	6
4	7	8
5	9	10
6	11	12

Note: alarm card relay 1 cannot be controlled from the keyboards as it is an alarm output contact that changes state when any alarm becomes active. This allows it to be used to switch a VCR into realtime recording etc. The duration is set in the matrix menu. – **Relay 1 Time**

CONFIGURATION USING THE TX1500 MENUS

NOTE only keyboard 1 can access the TX1500 system menu and only monitor 1 can display the menu.

Out of the box the TX1500 is configured to control BBV coaxial telemetry on all cameras and all keyboards can control all the monitors and cameras.

The TX1500 menu system allows the unit to be configured to your customer's site requirements.

To access the menu select monitor 1 by pressing '1' 'MON' and use keyboard 1. Press and hold the 'PROGRAM' key for 2-3 seconds and the following screen will be displayed and the 'PROGRAM' led is lit. If the menu is not displayed then check that the program key is enabled on the keyboard by turning switch 8 ON.

Press for 2 seconds

The menu is displayed and the PROGRAM led is lit.

```
  Enter Pin Number

  * * * * * *

  + or - = Enter Key
  Joystick to Navigate
  Press Program to exit

Exit
```

Enter the six digit PIN using keys 0 – 9.

The default PIN is 999999

Use the joystick left and right if a digit is entered incorrectly.

The TX1500 Main Menu is displayed if the PIN is correct otherwise the TX1500 reverts to normal control.

```
  TX1500 - Main Menu

  System Basics
  Access Tables
  Alarm Menus
  Sequences
  Camera Types
  Set Passwords
  System Parameters

  Exit    press + to select
```

To navigate through the menu, use the joystick and either the +/- keys to toggle a value or the numeric keys 0-9 if a value is required.

To exit the menu press the PROGRAM key at any point.

Each menu item is described on the following pages

SYSTEM BASICS

```
System Basics

Maximum Camera number   10
Maximum Alarm number    16
Text on Monitors   1+2+3+4
Display Line             9
System Type            PAL
Number of Keyboards      2

Return
```

This example screen shows the settings for a site with 10 cameras, 2 keyboards and a single alarm card with 16 alarm inputs.

Maximum Camera number:
Specifies how many video inputs are connected to the matrix and prevents switching to non-existent cameras. Valid values are 01 - 96

Maximum Alarm number:
Specifies how many alarm inputs are connected to the matrix. Set as below:-

Alarm cards	Maximum Alarm number
0	0
1	16
2	32
3	48
4	64
5	80
6	96

Text on Monitors:
Monitor outputs 1 – 4 display the camera number, monitor number and other messages. Text on these monitors can be disabled by using the + or – key to cycle through options.

Display Line:
The TX1500 status line can be moved up or down on the screen to prevent the TX1500 text from being overwritten by the text from other components of the system. Use +/- to cycle through values.
0 being the top of the screen and 10 the bottom of the screen.

System Type:
Sets the CCTV video standard as PAL or NTSC. Use the +/- keys to select the standard. Normally PAL in the UK.

Number of Keyboards:
Sets the number of keyboards connected to the matrix

Return:
Returns to the TX1500 Main Menu.

ACCESS TABLES

One of the advanced features of the TX1500 system is the ability to prevent specific cameras from being displayed on specific monitors and to prevent specific keyboards from moving cameras.

The Access Table screen is used to program which monitors each keyboard can control. A setting of 'Y' is used if the keyboard is allowed to control a monitor and 'N' to prevent control.

```
Access Table
Keyboard to Monitors

             1 2 3 4 5 6 7 8
1 Tx 1500 v6 Y N N N N N N N
2 Tx 1500 v6 N Y N N N N N N
3 Not Fitted N N N N N N N N
4 Not Fitted N N N N N N N N


Return
```

This screen shows the settings for a site with two keyboards. Each keyboard has it's own monitor and is locked out of controlling the other keyboard's monitor.

i.e.
Keyboard 1 can control monitor 1 ONLY
Keyboard 2 can control monitor 2 ONLY

Pressing the +/- keys will toggle the value of each monitor between Y and N.

NB: Keyboard 1 can always control monitor 1 as this is used to setup the matrix.

On power up the matrix interrogates devices on the BBUS and all control devices are displayed on this screen. Recognised control devices are:-.

Displayed	Description
TX 1500	Standard TX1500 joystick keyboard
TCommand	Touch Screen keyboard
232 I/F	BBUS Interface allowing control from PC and from remote sites etc.

Allocating cameras to monitors and keyboards is programmed from the Camera Types screen.

ALARM MENUS

Alarm handling of the TX1500 is programmed from the Alarm Menu screens.
Up to four actions can be carried out following each alarm activation. Eg four cameras could move to preset positions to triangulate onto an event.

On selection of Alarm Menus the following screen is displayed

```
You have 16 alarms
enabled and connected

Edit Alarm number  00
Input Action     Disable Alm
Alarm Beep Time    6 Seconds
Alarm Stack        Automatic
Relay 1 Time      60 Seconds


Return
```

This example shows a system with a single 16 input alarm card.

The TX1500 will display the total number of alarms that can be programmed based on the Maximum Alarm number set in the System Basics menu.

Input Action:
Sets the action for the ALARM 00 input on the matrix monitor board. Use +/- to cycle through the options.
No Action – ALARM 00 is not used.
Disable Alm – is used to disable all alarms when ALARM 00 is shorted to GND.
Alarm 00 – ALARM 00 is used as an alarm input in addition to the TX1500/AL16 alarm card inputs.
NOTE: Always handled in 'AUTOMATIC' mode, regardless of 'Alarm stack' setting.

Alarm Beep Time:
Number of seconds that all the keyboards 'beep' following an alarm input. Use +/- to cycle through the values.
0, 4, 6, 8, 10, 15, 20 Seconds

Alarm Stack:
The matrix alarm handling can be automatic, ie the system will drive cameras to presets as alarms occur or require an operator input before the alarm is actioned. Use the +/- to toggle between Automatic and Manual.
Automatic – Alarm activations are handled automatically
Manual – The ALARM key must be pressed to acknowledge an alarm activation

Relay 1 Time:
The number of seconds that the Relay 1 output of alarm card 1 is active following any alarm.
Use +/- to cycle through the various time delays. 10, 30, 60, 90, 120, 150, 200 or 250 seconds.

Enter the 2 digit alarm number you wish to program using the 0-9 keys. Eg enter 01 for alarm 1. The following screen will then be displayed. See the relay number mentioned on page 17.

```
Alarm  1
        kbd cam mon pre time
Act      1  01   1   01  30s

No Act   1  01   1   00  30s

No Act   1  01   1   00  30s

No Act   1  01   1   00  30s

Return    Exit next  prev
```

Each of the four actions can allow a camera to be moved to a preset position and displayed on a monitor output. In addition, if the monitor was sequencing before the alarm occurred, after '**time**' seconds the sequence is re-started.

If alarms are taken into the local alarm input of a telemetry receiver that supports local alarms, ie Rx100/Rx400DC/Rx45X/Rx55X, '**pre'** must be set to 00 as the preset will depend on the receiver alarm input. *(See the receiver manual for more details on local alarms.)*

This simple example shows alarm 1 moving camera 1 to preset 1 and display on monitor 1.

next and **prev** allow setting the alarm actions for the next and previous alarm inputs.

SEQUENCES

Each of the 8 monitor outputs of the TX1500 can sequence between all or specific cameras. Each camera can be individually added or removed from each monitor sequence. For example, in a retail environment public store monitors are prevented from displaying sensitive areas of the store whilst monitors in the security office can sequence all cameras.

```
Sequence Setup Selection

Cameras 01 - 08
Cameras 09 - 16
Cameras 17 - 24
Cameras 25 - 32
Cameras 33 - 40
Cameras 41 - 48
Cameras 49 - 56
Cameras 57 - 96
Return
```

If a camera greater than the Maximum Camera Number is added to a sequence this camera will be ignored when the sequence is running.

Selecting Cameras 01 – 08 will display the following screen

```
monitor sequence setup
         cam    1234    5678
1  2 Second     YYYY    YYYY
2  5 Second     YYYY    YYYY
3 15 Second     YYYY    YYYY
4 20 Second     YYYY    YYYY
5 25 Second     YYYY    YYYY
6 30 Second     YYYY    YYYY
7 Full Rand     YYYY    YYYY
8 Random        YYYY    YYYY
Return        Menu     Next8
```

Monitors 1 to 8 are shown with monitor 1 the top line and monitor 8 the bottom line.

The first item is the type of sequence or the dwell time if running a standard sequence. The screen on the left shows all the variants of sequences and dwell times.

Sequence types:

2/5/15… Second – standard sequence with a dwell time before displaying the next camera.

Random – The cameras are sequenced as above from lowest to highest but with a random dwell time between each camera.

Full Rand – In Full Random the monitor will display a completely random camera for a random period of time. This is useful for public display monitors on shop floor to prevent shoplifters remembering the displayed sequence.

A camera will be in a specific monitor's sequence if a Y is displayed or be skipped if an N is displayed.
Use the + or – keys to toggle between Y and N.

Next8 displays the next bank of 8 cameras.

CAMERA TYPES

These screens are used to set the type of telemetry for each camera and which monitors and keyboards are allowed to view and control each camera.

```
Camera Setup Selection

Cameras 01 - 08
Cameras 09 - 16
Cameras 17 - 24
Cameras 25 - 32
Cameras 33 - 40
Cameras 41 - 48
Cameras 49 - 56
Cameras 57 - 96
Return
```

The cameras are again displayed in banks of 8 as shown on the following screen:

Start at Cameras 01 – 08 to display the setup screen

```
Camera 01-08  Kbd  Monitor
              1234 12345678
01 BBV coax   YYYY YYYYYYYY
02 BBV coax   YYYY YYYYYYYY
03 Static     YYYY YNYYYYYY
04 BBV coax   YYYY YYYYYYYY
05 BBV 422    YNNN NYNNNNNN
06 BBV coax   YYYY YYYYYYYY
07 Unused     YYYY YYYYYYYY
08 Unused     YYYY YYYYYYYY
Return         Menu   Next8
```

This example shows Camera 1,2,4 & 6 with coax telemetry and able to be viewed on all monitors and controlled from all keyboards.

Camera 3 is a static camera that can be viewed on all monitors apart from monitor 2.

Camera 5 is driving via BBV RS422 and can only be viewed on monitor 2 and controlled by keyboard 1.

Cameras 7 & 8 are unused.

The choices for camera type are:

BBV coax - Standard BBV up-the-coax telemetry (Rx100/200/300/400P/400DC/Rx45X & Rx55X)
BBV 422 - BBV RS422 telemetry also used when driving additional protocols via a StarCard/converter
VCL coax - Control only available on monitors 1-4 ***this is a limited implementation of the Protocol***
PEL coax - Control only available on monitors 1-4 ***this is a limited implementation of the Protocol***
VISTA cx - Supports VISTA POWER DOME and other Domes VISTA range.
Contact support for more information
VISTA TP - Supports VISTA POWER DOME and other Domes VISTA range.
Contact support for more information
STATIC - Telemetry is disabled
Unused – The camera is not fitted and can't be viewed manually or in a sequence.
Other types may be selectable, please check with BBV before choosing these.

BBV coax would be used to control the existing range of BBV up-the-coax receivers.
Rx100 for dome control. Rx200/300/400P for AC heads, Rx400DC for high/variable speed 24Vdc heads.
The maximum distances that should be used are: 250M of RG59 and 500M of CT125 grade cable.
BBV 422 is used to drive the new advanced range of addressable BBV receivers that are controlled using two wire RS422. The RX45X is used when driving AC pan/tilt heads and the RX55X is used for high/variable speed 24Vdc heads. Both receivers offer additional features including an On Screen Display with an advanced menu system, 8 local alarm inputs, wide input supply, DIP switch addressable allowing either star or daisy chained wiring.
Selected 3rd party domes and telemetry receivers can be controlled via RS422 and a BBV STARCARD/CONVERTER. The camera type must also be set to BBV 422.
Full details can be found on the BBV web site www.bbvcctv.com

Kbd: If a keyboard is allowed to control the camera, select Y, or if the keyboard can only view but not control the camera, select N.
Monitor: Select Y if the camera can be displayed on each monitor or N if not. This allows cameras to be hidden from specific monitors/operators.

VISTA Coax Extended Commands on the Tx1500Matrix

Supports 86 Presets Presets 1 thought to 88 except 33 & 34

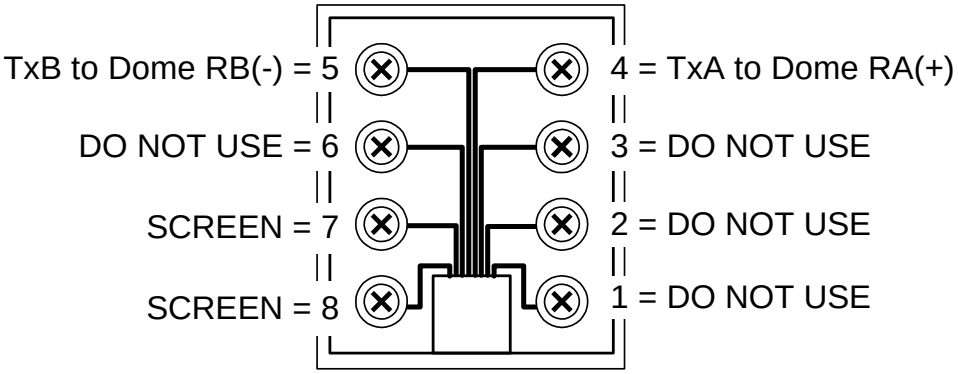
Keyboard	***VISTA COAX Command***	*Keyboard*	***VISTA COAX Command***
91 Preset	***RUN Learn 1***	1 Patrol	***RUN Tour 1***
92 Preset	***RUN Learn 2***	2 Patrol	***RUN Tour 2***
93 Preset	***Program Learn 1***	Iris Open	***Enter***
94 Preset	***Program Learn 2***	Iris Close	***ESC***

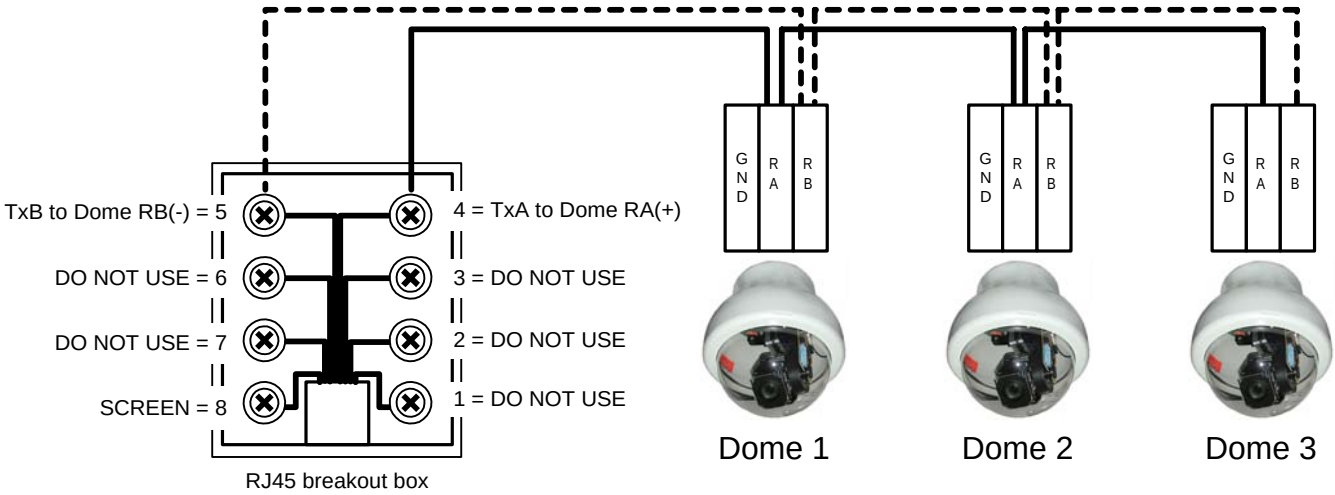
1# ***Enter Dome Menu (min idome) VPD-4WP-P-C/L***
1# 1# ***Enter Dome Menu (VISTA POWER DOME)***

DomeMENUPassword“1234”

On the **VPD-4WP-P-C/L** if you press the Autopan Key nothing will happen until you either:
i) Press the Iris close and it will start a ***dome scan*** if saved.
ii) Use the joystick and it will go in to the menu ***Password screen***.

RS422 (simplex) TELEMETRY OUT





This port provides telemetry control via BBV RS422 (simplex). A Cat 5 RJ45 patch cable and breakout box is used to connect the VISTA DOME CAMERAS via single twisted pair cable. It is possible to either wire the network in a daisy chained or star configuration using an optional RS422 Starcard.

Telemtry Function

Protcoal	BBV coax	BBV485	VCL coax	Pelco coax	VISTA coax	VISTA 485 TP
Maximun cable Distance	250M RG59 500M CT125	1200M BELDEN 8723	250M RG59 275M CT125	250M RG59 275M CT125	250M RG59 275M CT125	1200M BELDEN 8723
1#	REFER TO RECEIVER MANUAL	REFER TO RECEIVER MANUAL	N/A	ENTER DOME MENU	ENTER DOME MENU	ENTER DOME MENU
2#	REFER TO RECEIVER MANUAL	REFER TO RECEIVER MANUAL	N/A	180 FLIP	EXIT DOME MENU	EXIT DOME MENU
3#	REFER TO RECEIVER MANUAL	REFER TO RECEIVER MANUAL	N/A	N/A	AUTOPAN	Menu Esc Key no Shift
4#	REFER TO RECEIVER MANUAL	REFER TO RECEIVER MANUAL	N/A	SOFT RESTART	RESET DOME	Menu Esc Key with Shift
5#	N/A	N/A	N/A	N/A	N/A	Freeze off
6#	N/A	N/A	N/A	N/A	N/A	Freeze on
7#	N/A	N/A	N/A	N/A	N/A	Color Mono toggle
8#	N/A	N/A	N/A	N/A	N/A	180 Flip
9#	N/A	N/A	N/A	N/A	N/A	Auto Focus toggle
10#	N/A	N/A	N/A	N/A	N/A	Auto Iris toggle
Number of Presets Spproted	16	32	99	32	86 1 thought to 88 except 33 & 34	32
GOTO 33 PRESET	N/A	N/A	180 FLIP	N/A	N/A	N/A
GOTO 80 PRESET	N/A	N/A	AUTOFOCUS ON	N/A	N/A	N/A
GOTO 81 PRESET	N/A	N/A	AUTOFOCUS OFF	N/A	N/A	N/A
GOTO 91 PRESET	N/A	N/A	N/A	N/A	RUN Learn 1	N/A
GOTO 92 PRESET	N/A	N/A	N/A	N/A	RUN Learn 2	N/A
GOTO 93 PRESET	N/A	N/A	N/A	N/A	Program Learn 1	N/A
GOTO 94 PRESET	N/A	N/A	N/A	N/A	Program Learn 2	N/A
GOTO 99 PRESET	N/A	START AUTOPAN	START AUTOPAN	START AUTOPAN	START AUTOPAN	N/A
Iris Open	N/A	ENTER WHEN IN THE MENU	N/A	ENTER WHEN IN THE MENU	ENTER WHEN IN THE MENU	N/A
Iris Close	N/A	N/A	N/A	N/A	ESCAPE	N/A

SET PASSWORD

```
TX1500          version  3.5

Change Pin Number

New Pin Number  ******
Confirm Number  ******
Download
Upload
Initialise System

Return   Exit
```

The default menu password of 999999 can be changed using this screen.
MAKE A NOTE OF THE NEW PIN.

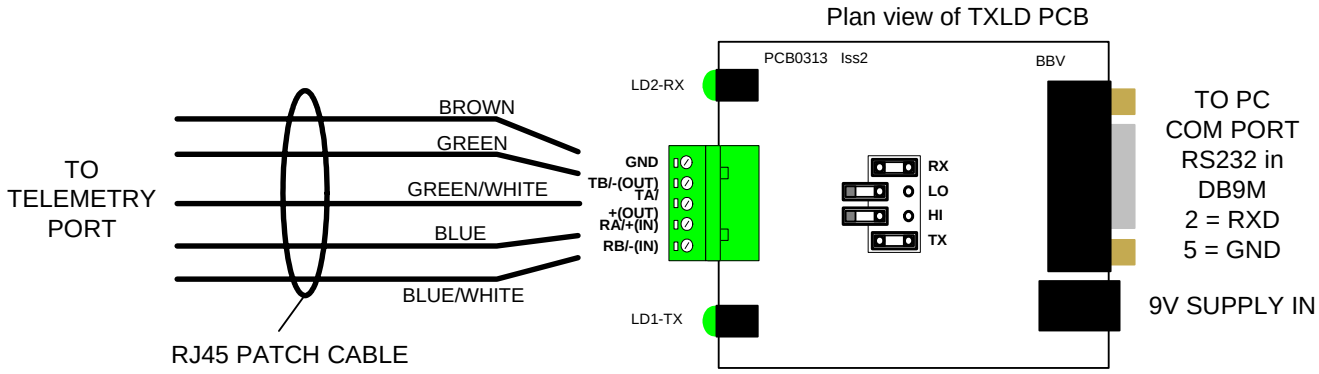
The matrix software version is displayed at the top of the screen.

Select the New Pin Number area and type the new PIN. Move to the Confirm Number area and retype the PIN.
If the numbers match then a confirmation screen is displayed. Select EXIT to return to normal operation.

Upload
This feature stores the system parameters onto a pc to allow for backup. Data is transferred via the telemetry port. Connection to a normal serial com port is made through a BBV TXLD. PC application software is called 'UP_DOWN_GUI' and is available on the BBV website at www.bbvcctv.com or contact support

Download
This feature restores the system parameters from a pc. Data is transferred via the telemetry port.

Initialise System:
Cause the entire matrix programming to be deleted and default settings used.
This function must be used with great care, as ALL programming will be lost.



UPLOAD/DOWNLOAD CONNECTION TO PC

SYSTEM PARAMETERS

Used to program additional settings as follows:

```
System Parameters

System Parameters 2

Menu Timeout      60 Seconds
Program Timeout   20 Seconds
Lockout Delay     10 Seconds
Relay 0 Action     Latching

Return
```

System Parameters 2:
Displays the 2nd page of system parameters.

Menu Timeout:
Number of seconds of inactivity before the menu is automatically exited. Use +/- to cycle through values.
15, 20, 40, 60, 80, 100, 120, 150, 180, 200 or 250 seconds.

Program Timeout:
Number of seconds the keyboard will stay in programming mode after the PROGRAM key is pressed. This is to prevent preset positions from being overwritten accidentally. Use +/- to cycle through values.
15, 20, 40, 60, 80, 100, 120, 150, 180, 200 or 250 seconds. It is recommended that a short time is selected.

Lockout Delay:
Number of seconds that the PTZ control of a camera is locked out after the last movement command. Used to prevent two keyboards from 'fighting' for control of the same camera. Use +/- to cycle through values.
3, 5, 8, 10, 12, 15, 20, 30, 40, 60, 80, 100 or 250 seconds. 10 seconds would be an appropriate value.

Relay 0 Action:
Latching – Pressing the keyboard's TRIANGLE key will toggle the state of the monitor output card relay.
Momentary – The relay will switch whilst the TRIANGLE key is pressed and switch back again when the key is released.

SYSTEM PARAMETERS 2

Used to program additional settings as follows:

```
System Parameters 2

Bump Cameras          off
Return to patrol     off
Priority Keyboard    off

Startup Actions
Monitors in sequence
                    None

Return
```

Bump Cameras:
Selects the keyboard(s) that will remove the current camera from other monitors when controlled manually. This is to prevent, for example, public display store monitors from displaying cameras that are following a suspect.
Use +/- to cycle through options:-
Off, Kbd 1, Kbd 2, **Kbd 1 + 2**, **Kbd 3**, **Kbd 4**, **Kbd 1 + 2 + 3**, **Kbd 1+2+3+4**

Return to patrol:
If set to on, the current camera will start a preset patrol 1, if supported, when another camera is selected. This is useful for a system that has several cameras that should run preset patrols all the time that they are not controlled manually.

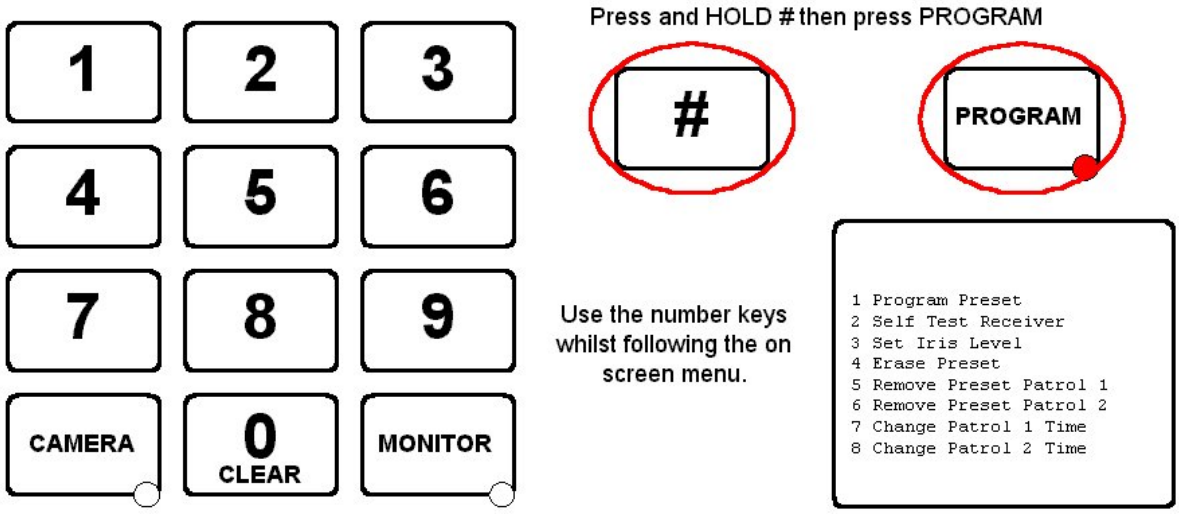
Priority Keyboard:
A keyboard can be set that can take control of cameras at any time and is not locked out by other keyboards.

Startup Actions – Monitors:
This option allows selected monitors to resume sequence should the system power fail and restore. Use +/- to cycle between the monitor choices.

None, **8**, **78**, **678**, **5678**, **45678**, **345678**, **2345678**, or **12345678.**

UP-THE-COAX RECEIVER SPECIFIC PROGRAMMING

To program specific features of Rx100/200/300/400P/400DC up-the-coax receivers, the camera type must be set to BBV COAX. Press and hold the '#' key and tap the PROGRAM key to display the options. The PROGRAM key must be enabled in the keyboard using SW1 switch 8 ON which is the factory default setting.



1 Program Preset 01-16
Enter 01 – 16 to program this preset position.
This is a legacy function to program a preset position and the preferred method is described on page 25.

2 Self Test Receiver
This will start the remote self test function, i.e. left/right/up/down etc on BBV up-the-coax receivers only.

3 Set Iris Level
Used with Rx300 Rx400P and Rx400DC to set the iris override output if fitted.

4 Erase Preset 01-16
Used to erase a preset from an RX100, RX400P or RX400DC. Enter 01 – 16 to erase the preset position.

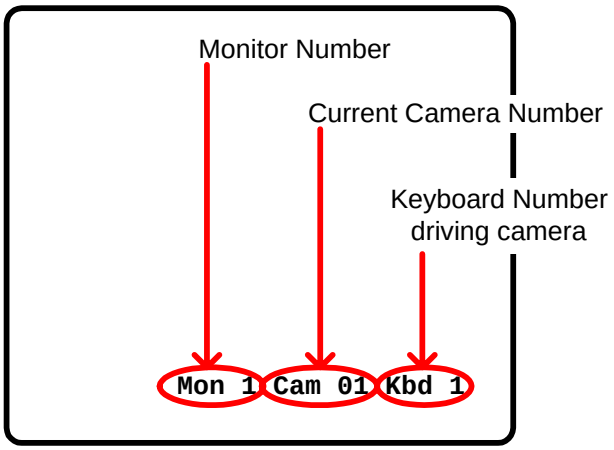
5 Remove Preset Patrol 1
Enter 01 – 16 to remove the preset from preset patrol 1 with RX100, RX400P and RX400DC receivers

6 Remove Preset Patrol 2
As above but removes the preset position from patrol 2

7 Change Patrol 1 Time
Used to set the dwell time for patrol 1. 01 = RANDOM, 02 = 12 seconds, 03 = 24 seconds etc up to 16 = 180 seconds when used with Rx100, Rx400P and Rx400DC receivers.

8 Change Patrol
As above but relates to preset patrol 2.

The menu will timeout and the PROGRAM key LED will turn OFF after several seconds to prevent accidental reprogramming of the receiver.



Monitor outputs 1,2,3 & 4 have an On Screen Display as shown on the left.

The Monitor number along with current Camera number is shown permanently.

Kbd is displayed whenever a keyboard is driving a camera.

Monitor outputs 5,6,7 & 8 are not equipped with On Screen Displays and are generally used as spot, park or public display monitors.

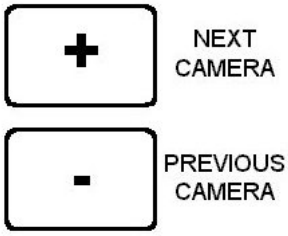
SELECTING A CAMERA

Use the number keys followed by the CAMERA key.

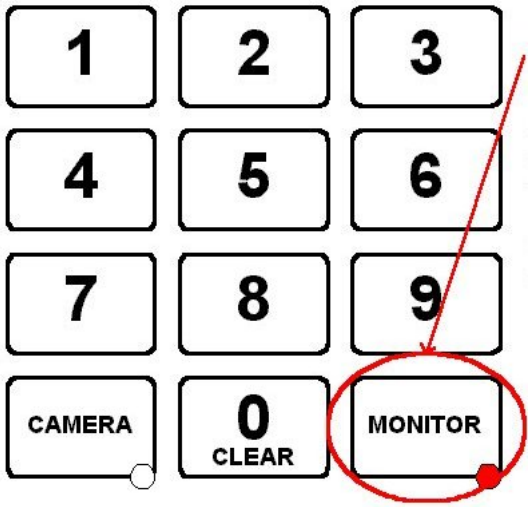
If the keyboard AND monitor are allowed to display the camera then the current monitor will now display this camera.

If not then the command is ignored.

Whilst the CAMERA key LED is ON the + and - keys can be used to easily switch to the next or previous camera.



SELECTING A MONITOR



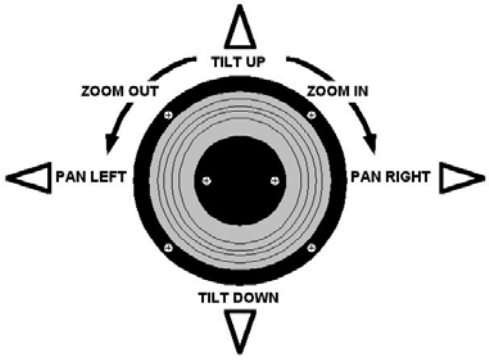
Use the number keys followed by the MONITOR key.

If the keyboard is not allowed to control this monitor then the command is ignored.

Otherwise the keyboard can now control the camera displayed on the new monitor

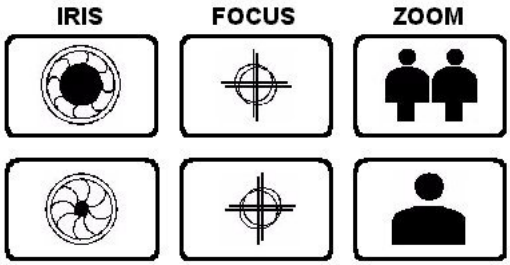
MOVING A CAMERA

JOYSTICK



The joystick is used to pan and tilt the camera and drive the lens zoom.
Moving the joystick left and right will pan the camera and moving the joystick up and down will tilt the camera.
Rotating the joystick knob clockwise will zoom the lens IN and rotating the knob anti-clockwise will zoom the lens OUT.
The joystick gives variable speed control

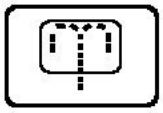
LENS KEYS



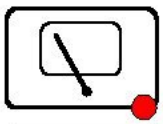
These keys are used to zoom and focus the lens and alter the iris if that function has been provided.

Press a key for the desired function and release to stop.

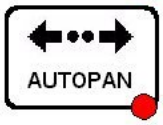
AUXILIARY OUTPUTS



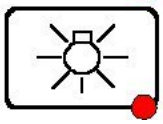
The WASH key is used to wash the camera housing's glass if the feature has been provided.



The WIPER key is used to toggle the camera housing's wiper ON/OFF

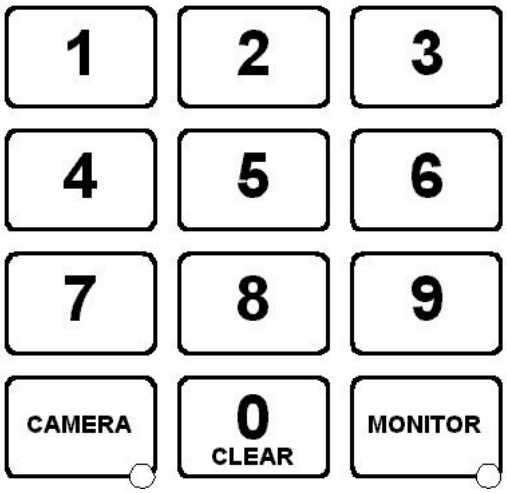


The function of the AUTOPAN key will vary depending upon the camera being controlled but mainly is used to make the camera either pan from end stop to end stop or to run a preset patrol. Moving the joystick left or right will turn autopan off.



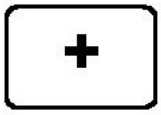
The LIGHTS key is used to toggle any lights ON/OFF

GOTO PRESET POSITION



Use the number keys followed by the PRESET key.

Whilst the PRESET key LED is ON the + and - keys can be used to easily switch to the next or previous preset position.

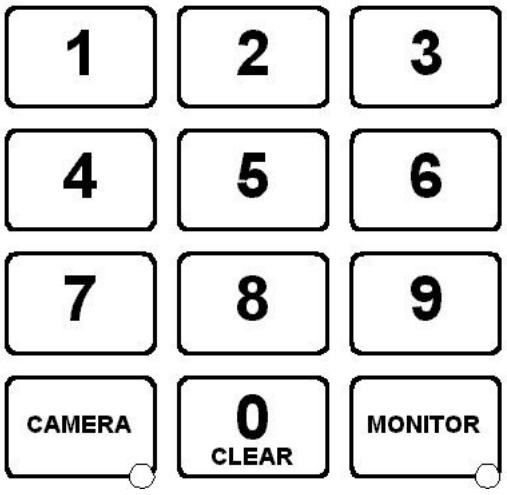


NEXT POSITION

PREVIOUS POSITION

Preset positions are only available on moving cameras that are equipped for presets. Most will accept presets 1 – 16 although the TX1500 supports preset positions up to 99. This should be checked with your installing company.

PROGRAMMING A PRESET POSITION

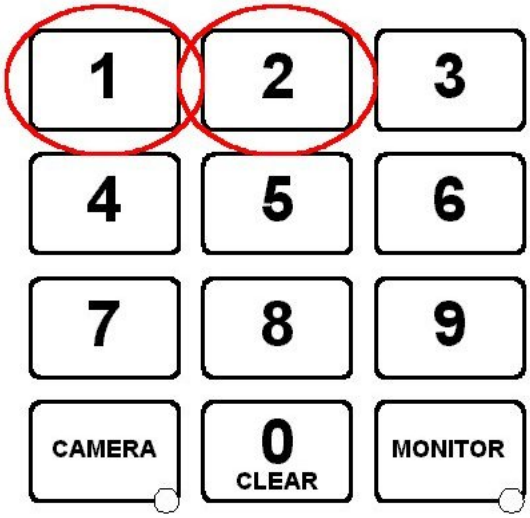


Press the PROGRAM key to turn the PROGRAM key LED ON. The unit is now in preset programming mode.

If the LED doesn't light then this keyboard has been prevented from programming presets by the installation company.

Use the number keys followed by the PRESET key to program the new preset position.

STARTING A PRESET PATROL



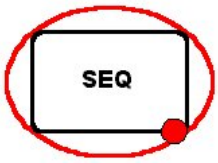
Press either 1 or 2 followed by the PATROL key.

The PATROL key LED will be ON whilst the current camera is running a preset patrol.

To stop the camera from patrolling, move the joystick. The PATROL key LED will now be OFF.

As with presets, patrols are only available on moving cameras that are equipped for presets. Certain dome cameras offer enhanced patrol features that will be covered in the product addendum sheet for each specific dome type.

STARTING A MONITOR CAMERA SEQUENCE



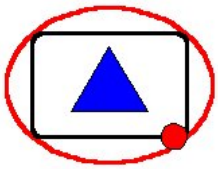
Pressing the SEQ key will start a camera switching sequence on the current monitor. The SEQ key LED indicates if the current monitor is running a sequence.

Each monitor can sequence individually and simultaneously.

The monitor sequence is programmed by the installation company using the system configuration menu.

To stop the sequence either press the SEQ key again to toggle the LED OFF or select another camera.

TRIANGLE / RELAY KEY



Use the TRIANGLE key to operate the TX1500 change over relay on the monitor out card. This can be used for a variety of purposes. Your installation company will inform you of the specific function for your site.

The relays on each alarm card can also be switched as follows:

3 TRIANGLE – relay 1 alarm card 2
5 TRIANGLE – relay 1 alarm card 3
7 TRIANGLE – relay 1 alarm card 4
9 TRIANGLE – relay 1 alarm card 5
11 TRIANGLE – relay 1 alarm card 6

2 TRIANGLE – relay 2 alarm card 1
4 TRIANGLE – relay 2 alarm card 2
6 TRIANGLE – relay 2 alarm card 3
8 TRIANGLE – relay 2 alarm card 4
10 TRIANGLE – relay 2 alarm card 5
12 TRIANGLE – relay 2 alarm card 6

ALARM KEY

If the system has been configured for KEY PRESS alarms by the installation company, following a site alarm the ALARM key LED will be ON, the alarm monitor will display ‘alarm’ and the alarm keyboard will beep.

The alarm is acknowledged by pressing the ALARM key. The alarm monitor/s will display the camera/s programmed for this alarm.

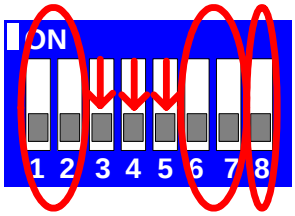
TX1500/KBD - System Keyboard

This keyboard provides control of the system and any cameras connected to the matrix. The keyboard communicates through an RJ45 connector using BBV TX1500 protocol at 9600 baud on an RS422 link.

An internal 8 way DIP switch is used to set the keyboard address, RS422 termination and PROGRAM key enable/disable.

Each keyboard must have a unique address between 1 and 4. Keyboards sharing the same address will not be recognised by the matrix and unpredictable operation will occur.

Keyboard switch settings



SW 1-2	Keyboard Address
SW 3-5	OFF
SW 6-7	ON = BBUS Termination for end of line
SW 8	ON = PROGRAM key enable

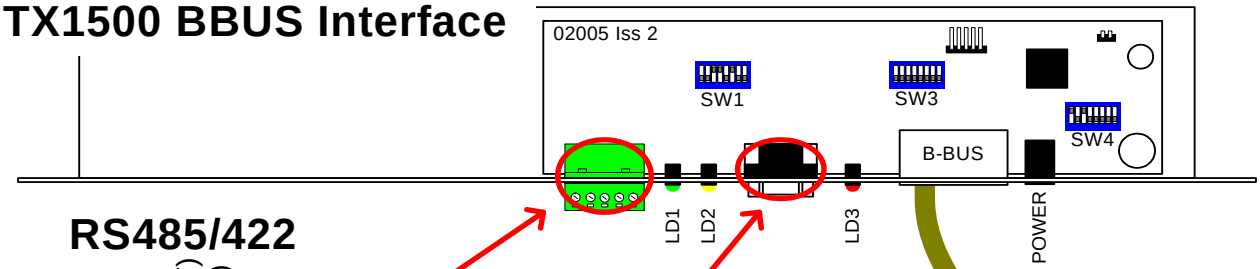
Keyboard Address	SW1	SW2
1	OFF	OFF
2	ON	OFF
3	OFF	ON
4	ON	ON

Joystick Calibration Procedure
If the joystick needs recalibration then follow instructions below:-

1. Power down the keyboard for 30 seconds.
2. Press and hold both the **1** and **TRIANGLE** keys and power up the keyboard.
3. The TRIANGLE led will then flash indicating that the keyboard is in calibration mode.
4. Press **5** to set the joystick zero position.
5. Move the joystick fully UP and hold in this position and press **2**
6. Move the joystick fully DOWN and hold in this position and press **8**
7. Move the joystick fully LEFT and hold in this position and press **4**
8. Move the joystick fully RIGHT and hold in this position and press **6**
9. Rotate the joystick knob fully clockwise (ZOOM IN) and hold in this position and press **ZOOM IN**
10. Rotate the joystick knob fully anti-clockwise (ZOOM OUT) and hold in this position and press **ZOOM OUT**
11. Calibration is then complete. Power down the keyboard for 30 seconds before powering up. Check that the TRIANGLE led is not flashing after power up if it is then power down again for 30 seconds.

The keyboard requires 9Vac/dc supply, minimum current of 100mA. A single keyboard can be supplied through a patch cable from the matrix. Multiple or remote keyboards will need separate power supplies, which are supplied as standard with each keyboard. Additional power supplies can be obtained from BBV.

TX1500 BBUS Interface



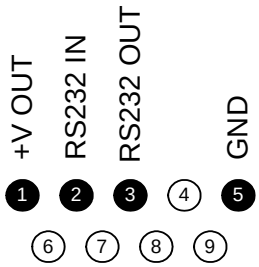
RJ45 to TX1500 BBUS

RS485/422

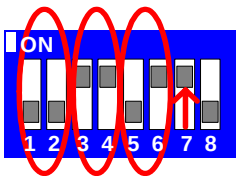
5 RB/-(IN)
4 RA/+(IN)
3 TA/+(OUT)
2 TB/-(OUT)
1 GND

RS232

Chassis Mount DB9 Male



SW1 Settings



1/2 = BBUS termination
Must be ON only when the interface is at the end of line.
Default = OFF

3/4 = RS485 termination
Must be ON only when the interface is at the end of line. Default = ON.

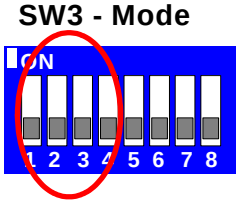
5/6 = RS232 or RS485 selection.

SW1/5	SW1/6	Input
OFF	OFF	None
ON	OFF	RS485
OFF	ON	RS232 (Default)
ON	ON	DO NOT USE

7 = MUST BE ON

8 = NOT USED

SW3 - Mode



SW3/1 Select mode

OFF	BBUS Mode - RS232 control
ON	Remote keyboard mode Running Tx1500 keyboard over a RF link, fibre or other network.

LED guide

GREEN LD1

Flashes when the interface sends an LED status to the RS232 port.

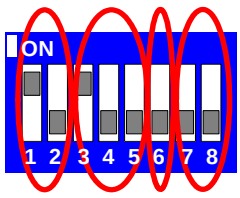
YELLOW LD2

Flashes when interface receives a command from the RS232 port.

RED LD3

BBUS comms status.
OFF = Unit de-powered
ON = Unit Powered but not communicating with the Tx1500.
Pulsing Very Fast = Comnunicating correctly.

SW4 Settings



1/2 = BBUS Address

SW4/1	SW4/2	Addr	Keyboard No
OFF	OFF	0	1
ON	OFF	1	2 (Default)
OFF	ON	2	3
ON	ON	3	4

3/4/5 = Default Monitor Selection

SW4/3	SW4/4	SW4/5	Monitor
OFF	OFF	OFF	1
ON	OFF	OFF	2 (Default)
OFF	ON	OFF	3
ON	ON	OFF	4
OFF	OFF	ON	5
ON	OFF	ON	6
OFF	ON	ON	7
ON	ON	ON	8

6 = Control Protocol Selection

SW4/5	Protocol
OFF	TX1000 (Default)
ON	TX1500

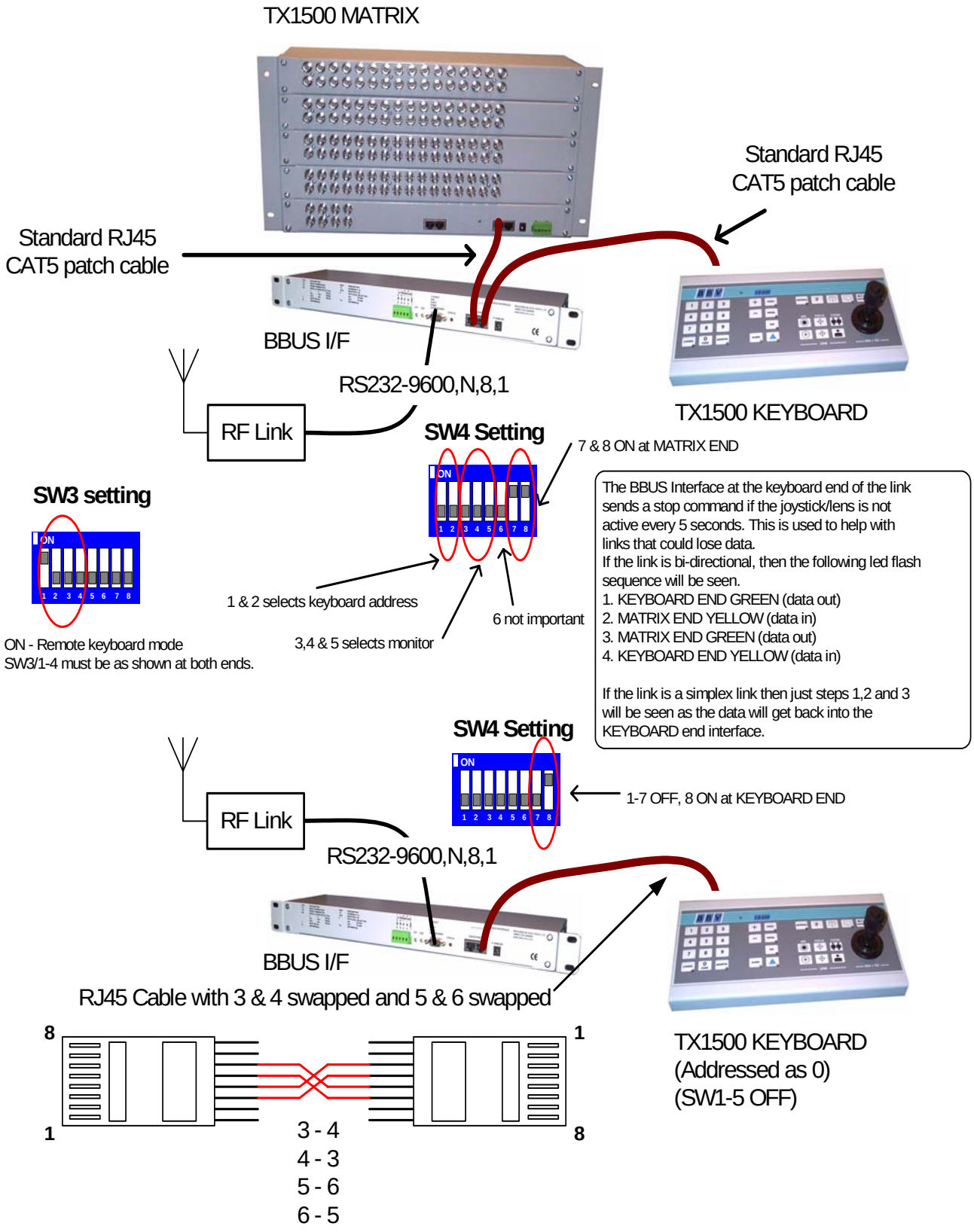
7/8 Remote Tx1500 keyboard modes

SW4/7	SW4/8	Mode
OFF	OFF	Normal mode (SW3/1 OFF)
ON	ON	Matrix End (SW3/1 ON)
OFF	ON	Keyboard End (SW3/1 ON)

7/8 Variable/Fixed speed when in normal mode

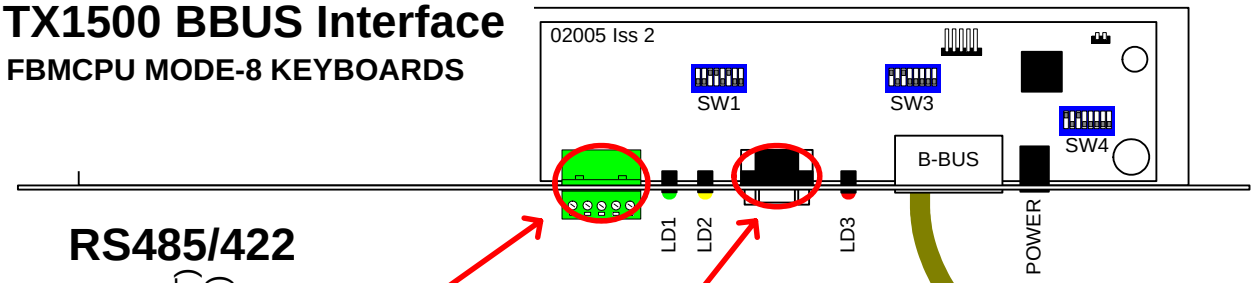
OFF	OFF	Variable speed
ON	OFF	Fixed speed - High Speed (8)
ON	ON	Fixed speed - Low speed (2)

BBUS I/F FOR REMOTE TX1500 KEYBOARD


TX1500 MATRIX
Standard RJ45
CAT5 patch cable
Standard RJ45
CAT5 patch cable
BBUS I/F
RS232-9600,N,8,1
RF Link
TX1500 KEYBOARD
SW4 Setting
7 & 8 ON at MATRIX END
SW3 setting
ON
1 2 3 4 5 6 7 8
1 & 2 selects keyboard address
3,4 & 5 selects monitor
6 not important
ON - Remote keyboard mode
SW3/1-4 must be as shown at both ends.
The BBUS Interface at the keyboard end of the link sends a stop command if the joystick/lens is not active every 5 seconds. This is used to help with links that could lose data.
If the link is bi-directional, then the following led flash sequence will be seen.
1. KEYBOARD END GREEN (data out)
2. MATRIX END YELLOW (data in)
3. MATRIX END GREEN (data out)
4. KEYBOARD END YELLOW (data in)
If the link is a simplex link then just steps 1,2 and 3 will be seen as the data will get back into the KEYBOARD end interface.
SW4 Setting
1-7 OFF, 8 ON at KEYBOARD END
RF Link
RS232-9600,N,8,1
BBUS I/F
RJ45 Cable with 3 & 4 swapped and 5 & 6 swapped
8
1
1
8
3 - 4
4 - 3
5 - 6
6 - 5
TX1500 KEYBOARD
(Addressed as 0)
(SW1-5 OFF)

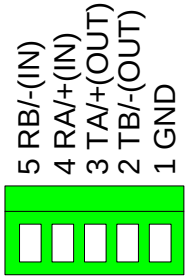
TX1500 BBUS Interface

FBMCPU MODE-8 KEYBOARDS



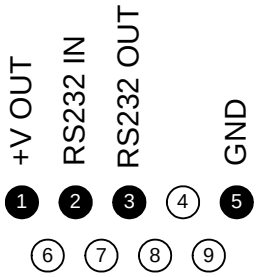
RJ45 to FBMCPU BBUS

RS485/422

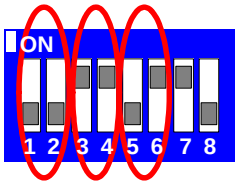


RS232

Chassis Mount DB9 Male



SW1 Settings



1/2 = BBUS termination
Must be ON only when the interface is at the end of line.
Default = OFF

3/4 = RS485 termination
Must be ON only when the interface is at the end of line. Default = ON.

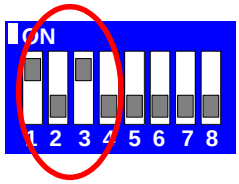
5/6 = RS232 or RS485 selection.

SW1/5	SW1/6	Input
ON	OFF	RS485
OFF	ON	RS232
ON	ON	DO NOT USE

7 = MUST BE ON

8 = NOT USED

SW3 - Mode



SW3 Select mode
1-4 set the switches as shown to select FBMCPU mode which allows 8 keyboard addresses

LED guide

GREEN LD1

Flashes when the interface sends an LED status to the RS232 port.

YELLOW LD2

Flashes when interface receives a command from the RS232 port.

RED LD3

BBUS comms status.
OFF = Unit de-powered
ON = Unit Powered but not communicating with the FBMCPU.
Pulsing Very Fast = Comnunicating correctly.

This mode is to allow the BBUS/I-F to connect to the processor of our larger FBM matrix system. The FBM matrix allows up to 8 keyboard positions where the standard TX1500 mode allows 4 addresses.

If the BBUS/I-F is used with a TX1500 then DO NOT use this mode.

TX1500 control protocol via the TX1500/BBUS/I-F

The ZP-TX1500 matrix can be controlled using a simple serial protocol with the use of a TX1500/BBUS/I-F interface. The protocol is described on the following pages.

Baud settings: 9600,N,8,1. Timing is not critical.

Function	String	Notes
SELECT MONITOR	@2,M <CR>	M = monitor number (1 - 8)
SELECT CAMERA	@3,C <CR>	C = camera number (1 - 96)
PAN RIGHT	@5,2 <CR>	
PAN LEFT	@5,3 <CR>	
TILT UP	@5,4 <CR>	
TILT DOWN	@5,5 <CR>	
ZOOM IN	@5,6 <CR>	
ZOOM OUT	@5,7 <CR>	
FOCUS FAR	@5,8 <CR>	
FOCUS NEAR	@5,9 <CR>	
IRIS CLOSE	@5,10 <CR>	
IRIS OPEN	@5,11 <CR>	
WASH ON	@5,12 <CR>	
WIPER ON	@5,19 <CR>	
LAMPS ON	@5,21 <CR>	
STOP PAN RIGHT	@6,2 <CR>	
STOP PAN LEFT	@6,3 <CR>	
STOP TILT UP	@6,4 <CR>	
STOP TILT DOWN	@6,5 <CR>	
STOP ZOOM IN	@6,6 <CR>	
STOP ZOOM OUT	@6,7 <CR>	
STOP FOCUS FAR	@6,8 <CR>	
STOP FOCUS NEAR	@6,9 <CR>	
STOP IRIS CLOSE	@6,10 <CR>	
STOP IRIS OPEN	@6,11 <CR>	
STOP WASH ON	@6,12 <CR>	
STOP WIPER ON	@6,19 <CR>	
STOP LAMPS ON	@6,21 <CR>	
STOP PAN/TILT/LENS	@6,22	Stops all pan/tilt and lens movement
PAN/TILT SPEED	@7,P,T <CR>	P=Pan & T=Tilt speed in the range 0 - 15 0 = slowest, 15 = fastest
GOTO PRESET	@8,P <CR>	P = preset number (1-99)
PROGRAM PRESET	@9,P <CR>	P = preset number (1-99)
START PATROL 1	@10 <CR>	
START AUTOPAN	@12 <CR>	
START MONITOR SEQUENCE	@25,0 <CR>	Same as hold off
STOP MONITOR SEQUENCE	@25,1 <CR>	Same as hold on

Relay ON (Triangle Key)	@50,X<CR>	X = 0 – 12 0 = Tx1500 relay 1 – 2 = relays 1 & 2 of alarm card 1 3 – 4 = relays 1 & 2 of alarm card 2 5 – 6 = relays 1 & 2 of alarm card 3 7 – 8 = relays 1 & 2 of alarm card 4 9 – 10 = relays 1 & 2 of alarm card 5 11 – 12 = relays 1 & 2 of alarm card 6
Relay OFF	@51,X<CR>	X = As above
HASH command	@52,X<CR>	X = hash number – see Tx1500 for specific hash commands.
Send Single Key Press	@53,0<CR>	'0' Key
	@53,1<CR>	'1' Key
	@53,2<CR>	'2' Key
	@53,3<CR>	'3' Key
	@53,4<CR>	'4' Key
	@53,5<CR>	'5' Key
	@53,6<CR>	'6' Key
	@53,7<CR>	'7' Key
	@53,8<CR>	'8' Key
	@53,9<CR>	'9' Key
	@53,10<CR>	'CAMERA' key
	@53,11<CR>	'MONITOR' key
	@53,12<CR>	'CLEAR' key
	@53,13<CR>	'+' key
	@53,14<CR>	'-' key
	@53,15<CR>	'PRESET' key
	@53,16<CR>	'PATROL' key
	@53,17<CR>	'SEQ' key
	@53,18<CR>	'RELAY/TRIANGLE' key
	@53,19<CR>	'ALARM' key
	@53,21<CR>	'PROGRAM' key
	@53,22<CR>	TX1500 MENU ACCESS
Display current Info	@54<CR>	Output current camera, monitor & lights status

All characters shown are the actual ASCII characters that should be sent. Two or three digit numbers will be sent using either two or three characters.
All commands are terminated with a <CR> = 0x0d or decimal 13

Examples

Select camera 1 onto monitor 4

@2,4 <CR>	Complete HEX byte string	0x40 0x32 0x2c 0x34 0x0d
@3,1 <CR>		0x40 0x31 0x2c 0x31 0x0d

Once the monitor is selected, any subsequent camera selects relate to this monitor ie to now select camera 16 send the following:
@3,16 <CR>

The current camera can then be controlled using the @5 and @6 commands.
@5 commands are used to start a function and @6 commands are used to stop a function. Only a single function can be controlled with each command

To Pan Left, Tilt Up and Zoom in, send the following:
@5,3 <CR>
@5,4 <CR>
@5,6 <CR>

Pan and Tilt speeds are sent using the @7 command. 16 speed are supported, 0 being the slowest speed up to 15 as the fastest.

If no speed command is sent following a @5 command then a speed of 1 will be assumed. This prevents the head from 'jerking' on movement start.

Speed Examples
Move Left at increasing speeds

@5,3 <CR>	Start Panning Left
@7,1,1 <CR>	Slow Pan Speed
@7,5,1 <CR>	Increased Pan Speed
@7,10,1 <CR>	Even Higher Pan Speed
@7,15,1 <CR>	Full Pan Speed

To stop movement in a direction send a @6 command followed by pan/tilt speed 0
To stop moving left send
@6,3 <CR>
@7,0,0 <CR>

Selecting a new camera whilst the current camera is moving will cause the current camera to stop moving before selecting the new camera.

Responses sent from the TX1500 BBUS Interface
Each response is followed by CR/LF.
On power up the following message is sent:: TX1500 BBUS I-F V6
After each successfully received command the interface responds with OK and ERR followed by reason if the command or a parameter is invalid.
After a @54<CR> command or if the current monitor, camera or LED status changes the following message is send. M1,C01 0000000
M = The monitor number, 1-8
C = The camera number, 1-96
The next 7 characters represent the LED status, 1 if the LED is ON, 0 is OFF as shown left to right.
LIGHTS, AUTOPAN, WIPE, ALARM, TRIANGLE, SEQ, PATROL
EG monitor 2 showing camera 45 which is running a patrol with the lights on.
M02,C45 1000010

If implementing software to control the ZP-TX1500 please check for a later version of the control protocol first.

NOTES

NOTES

BBV products

	Description
TX400	Single camera desktop telemetry transmitter with coax & 20mA telemetry, Pan/Tilt/Lens, Lights, Wash, Wipe, Autopan, 8 presets, preset patrol.
TX400DC	As TX400 including joystick for variablel Pan/Tilt control. Option of RS485 telemetry output.
TX1000 MK2	8 or 16 camera, 2 monitor telemetry transmitter. Up to 2 keyboards. BBV up-the-coax and RS422 standard with options for alarm inputs and 20mA telemetry.
TX1500	Mid size matrix 16 – 96 camera, 8 monitor. Up to 4 control positions (keyboard & remote control) options for alarms, remote control, BBV up-the-coax and RS485 telemetry.
FBM range	Large size matrix. Configurable up to 4096 cameras and 64 monitor outputs. Up to 8 control positions (keyboard & remote control) options for alarms, remote control RS485 telemetry with various options. Please call to discuss requirements.

All RX receivers below are powered by 230V ac or optional 110V or 24V ac.	
RX100	Dome Interface to drive a large library of dome cameras. BBV up-the-coax and 20mA telemetry. Mains or plugtop supply.
RX200	AC receiver for Pan only heads or static cameras, Wash/Wipe/Lights. BBV up-the-coax and 20mA telemetry.
RX300	AC receiver for Pan/Tilt/Zoom/Focus/Iris Override and 1 Auxiliary output. BBV up-the-coax and 20mA telemetry.
RX400P	AC full function receiver. PTZFI 4 Auxiliary outputs, 16 presets. BBV up-the-coax and 20mA telemetry.
RX400DC	24Vdc high/variable speed receiver. 16 presets, 8 local alarm inputs,3 Auxiliary outputs. BBV up-the-coax and 20mA telemetry.

RX45X (AC) RX55X (DC) Multi serial protocol and up-the-coax telemetry receivers	Multiple RS485/422 and up-the-coax controllable AC and DC receivers. PTZFI control, 32 presets, preset patrol, 8 local alarm inputs, 12V 500mA supply output. OSD for remote setup, test & diagnostics. 3 Aux. outputs RX55X or 4 Aux. outputs RX45X. Optional Privacy board. BBV RS422, UP-THE-COAX, 20mA current loop BAXALL STANDARD & ALTERNATE UP-THE-COAX, DENNARD RS422/485, PELCO P/D RS422/485, PHILIPS/BOSCH RS422/485 (OPTIONAL BI-PHASE INPUT), MOLYNX RS422/485, SENSORMATIC/AD RS422, VCL/HONEYWELL RS422/485, VICON RS422 MEYERTECH, CIRRUS AUDIO MONITORING
RX450/550	**PANASONIC RS485 Protocol only version of RX45X/55X.**

STARCARD STARCARD/CONVERTER	**8 * RS485 output, 2 wire simples RS422, 4 wire full-duplex RS422, 2 wire half-duplex RS485.** **Option STARCARD/CONVERTER offering protocol conversion to drive an increasing range of 3rd party protocols.**
CTI/16	**Multi-protocol serial converter that gives up-the-coax control to 16 cameras. BBV RS422, Dennard RS485, Pelco P, Pelco D, Philips/Bosch RS485/232, VCL RS485, Sensormatic RS422, Molynx, Vicon**

ACCESSORIES	**TxLD (bidirectional RS422-RS232 converter)** 98005 (bidirectional 20mA-RS232 converter)

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